

California's

CORNERSTONE
NUMBER - 1915
MAGAZINE



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Number**

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California's MAGAZINE

E. J. WICKSON, Editor

A QUARTERLY JOURNAL FOR THE DISSEMINATION OF AUTHENTIC
INFORMATION CONCERNING CALIFORNIA

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CALIFORNIA PUBLISHERS CO-OPERATIVE ASSOCIATION
SAN FRANCISCO, CALIFORNIA

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To the Public:



HIS IS the "Cornerstone Number" of CALIFORNIA'S MAGAZINE. It is so called for several reasons. One is that it contains the records of the time and place written by men and women representative thereof. The contributors to this number are leaders of progress in many lines of endeavor. If, in after years, this cornerstone is opened, their successors will read with keen appreciation of achievements, strenuous but peaceful, intelligently discussed at a time when so many of the greatest nations were locked in deadly combat; when destruction rather than construction seemed the ruling force of so great a portion of the world. These records will be fairly representative of the spirit of achievement that persisted in the West in the face of whatever pessimistic trend the world-thought might be taking.

Again, a cornerstone, technically speaking, binds together the two walls forming a right angle in a structure. The publishers of this magazine believe that with an issue of such magnitude and character, they have constructed and set in place a cornerstone which will prove adequate to bind firmly the walls of their purpose, *i. e.*, the further development, the upbuilding of California, and its even more universal recognition as one of the greatest of modern factors in the attainment of that "consummation devoutly to be wished"—universal harmony and the progress of all beneficent arts and industries.

It is the aim of the publishers of CALIFORNIA'S MAGAZINE to employ every commendable means to acquaint the people at large with the remarkable qualities of this state. It is their intention to "take California to the World," thereby effecting a community of interests, a coalition of ideas, a unity of endeavor which shall result in the increase of output and the broadening of commercial activities; the growth of population and the strengthening of all ties that make for greater perfection and advancement of California.

CALIFORNIA'S MAGAZINE welcomes, to this end, the active co-operation of all who love the interests of California as their own interests. It seeks the opportunity to further serve the cause of humanity and to spread

its gospel of construction to all parts of the world in the terms of California development. The making of this, the initial number, of CALIFORNIA'S MAGAZINE has been a task of no small proportions, but it has been, at the same time, largely a labor of love. When men engage upon a constructive work, actuated by high ideals and appreciating the true nature of service, they are naturally grateful for the chance afforded them of accomplishing something really worth the while.

The publishers believe that Providence makes particular provision for all work that is good and that certain men and women are ordained for labor of that character. Therefore, in striving to give credit where credit is due in the making of this number, they desire to express particular obligation to one who has done much to bring the work to a successful issue. E. J. Wickson, Professor of Horticulture and former Dean of the Agricultural College of the University of California, author of a number of standard works upon agricultural subjects and recognized authority in all matters appertaining to horticulture, has, as editor of this Cornerstone Number of CALIFORNIA'S MAGAZINE, instilled into it much of his own personality and thereby rendered it more interesting, authoritative and valuable. The publishers are deeply sensible of their indebtedness to him in the preparation of the great mass of material for this issue and take this opportunity of expressing their appreciation.

When they consider the long list of distinguished contributors to this number, the publishers believe they are justified in experiencing a feeling of pride and in maintaining that there has never before been included in one volume a more representative assemblage of writers who are at the same time leading citizens of the state, actively engaged in the furtherance of all effort tending to the preservation of its traditions, the continuation of its present-day prosperity and the realization of its future.

To be sure, there are phases of California life and industry that have been left practically untouched in this number. But this, in itself, renders the continued existence of the publication essential. There is California manufacture, for example, of which little has been said, but which is undoubtedly one of the state's most important lines of industry and one susceptible of extensive development. Doubtless there are scores of other interests in California—fundamental, important and significant in the development of the purposes of this publication.

What the contributors to this number of CALIFORNIA'S MAGAZINE have done for the publication they have done for California. Their service is therefore twofold and in expressing their own gratefulness for this

invaluable assistance the publishers feel that they may also include the appreciation of all those who make up the citizenship of the state.

California has a right to be proud of her citizenry. It is an asset whose importance can not be overestimated. Ours is a country of thinkers and, as a certain great teacher has remarked, "the time for thinkers has come." The influence of the Western atmosphere, the broadness of the land, the freedom of the life, and the health and vigor imparted by the clear air and by the cleanly lives of the inhabitants, inspires clarity of thought and reasoning powers. Those who have contributed to this number of CALIFORNIA'S MAGAZINE have demonstrated their ability to think along constructive lines and have enrolled themselves among the builders of California's greatness.

CONCERNING SERVICE

The publishers' conception of the word "service"—so widely used today, is truly philanthropic. It seems to them to embody humanitarian principles which should restrict its application to the loftier purposes of life and work. To serve mankind honestly is divine service. If CALIFORNIA'S MAGAZINE through its presentation of California's splendid potentialities thereby performs a service to the world, in pointing the way for some of its people to better things, its aim will have been largely accomplished. The service this magazine offers its readers is definite and it is theirs to command. California has a definite proposition for every man who enrolls himself among her supporters by investment or home-making and CALIFORNIA'S MAGAZINE purposes presenting this proposition so clearly and honestly that all may grasp its import and benefit thereby. California offers conditions little short of ideal for the development of youth into splendid types of manhood and womanhood—therefore California is desirable to the homeseeker. There is room here for growth; mental, moral, physical. California supplies opportunities for honest work amid the most agreeable surroundings and with prospects for rapid advancement. Therefore it is the place for those with life before them. California possesses an equable climate; its people find time for play as well as for work. Therefore it is the place for those who are no longer burdened with building for their own future, but whose concern is for others who are, and whose personal desires are limited to the comforts and enjoyments of home and peace. It is a state for those who are alive to the best things in life and who seek such things at their source.

CALIFORNIA'S MAGAZINE particularly desires that its readers shall make use of the service offered them to whatever extent required.

CALIFORNIA AS A CENTER

The idea of building a great publishing house on the Pacific Coast is the natural outcome of the tremendous impetus given the state as a result of the completion of the Panama Canal and the unmistakable and persistent trend of world-thought westward. That California is recognized as a world-center to be reckoned with now, more than ever, is patent to even the most casual observer. That it is destined to development far beyond present conceptions not alone in commercial, but in artistic lines as well, is an admitted fact. While the opening of this world waterway opens new channels for trade and determines beyond peradventure the future of California commercially, the growing importance of the state in art and letters must also be conceded. There is literature distinctly Californian which has long been recognized by the discerning public both here and elsewhere. Besides the world owes much to California for some of the world's greatest figures in art-achievement. The world's debt to California is due and payable now. And California is ready to collect. But in what form shall payment be made? In appreciation, recognition, just reward of merit. In such coin do Californians prefer to be compensated, for theirs is a heritage of spiritual power far transcending the merely material reward of dollars and cents.

CALIFORNIA'S MAGAZINE is the champion of all good things which are Californian. Its columns are open to its readers and their co-operation is always desired. The aim is to make this magazine different from any other publication not only in character of contents and illustration, but in respect to its policy and purpose-as well. To the end that better service may be rendered, the opinions and suggestions of readers are invited at all times.

Lastly, the publishers believe that the future "looms big with promise" to all who strive earnestly for the Truth. Supporting, encouraging and furthering their laudable efforts, CALIFORNIA'S MAGAZINE will endeavor to merit the continued respect and confidence of those to whom life means a consecration of labor to its highest ideals.


President
California Publishers
Co-operative Association,

*Publishers of
California's Magazine.*

SAN FRANCISCO, 1915.

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THREE big things have been accomplished in California this year: The Panama-Pacific International Exposition, the Panama-California Exposition—and CALIFORNIA'S MAGAZINE. Each marks an epoch in the further development of California's greatness. Preserve the records of this development in your file of this magazine by subscribing now.

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WHILE this Cornerstone Number of CALIFORNIA'S MAGAZINE is certain to be of value, the *service* we may be able to afford you later is of still more importance. In order that we may be in a position to help you in whatever concerns your desires regarding California, you should register with us now. Use blank on last page of this number. Do this whether you are in immediate need of service or not. It costs nothing and will bring you much. We will issue bulletins between our regular editions telling of opportunities in California for everyone. These will come to you if you are registered with us. If we know your wishes we shall then be able to select such matter as will apply to you most directly.

REPRESENTATIVES WANTED!

CALIFORNIA'S MAGAZINE wants men and women to act as its representatives in all parts of the country—persons who have vim, and energy and intelligence. Such persons can make an immediate success of this work, for "California's Magazine" practically sells itself. We want enthusiastic men and women—who are confident of themselves and of their work. In short, what we want are "Live Wires."

Our Proposition is an Attractive One

Special instructions and our terms to representatives will be sent on request—the man or woman who undertakes this work will find it lucrative, pleasant and interesting.

We would appreciate the co-operation of our readers to the extent of putting us in touch with persons they may know and whom they believe would be adapted for the purpose of obtaining subscriptions to this magazine; and acting as our representatives. Address:

CALIFORNIA'S MAGAZINE

NEW CALL BUILDING

SAN FRANCISCO

Publishers' Notes

IT was originally the intention to publish this volume as "The California Almanac." Later, the idea of issuing a quarterly publication and calling it CALIFORNIA'S MAGAZINE was adopted. This will explain to those who have seen announcements of the Almanac why its contents appear in this publication, and also accounts for the occasional references in the present number to the Almanac—references which were admitted through inadvertence. Everything that was to have appeared in the Almanac is contained in this Cornerstone Number of CALIFORNIA'S MAGAZINE, together with much additional material, so that those who have ordered or may have contemplated ordering the former publication will receive even more than they anticipated in the latter.

THE next issue of CALIFORNIA'S MAGAZINE will be out before October 1, and will be the Autumn Number. While it will contain fewer pages than the present issue, it will, nevertheless, be much bulkier than the average periodical and in the quality and scope of contents and in the importance of contributors will prove an exceptional number.

TO the end that people everywhere be made to realize fully the wonderful possibilities of this State, the publishers invite the co-operation of Californians in supplying such facts as may have come within their own observation and experience that will tend to show what California can do for the world. If, for example, you have made a success in

farming on a small scale; or if some particular branch of agriculture has rewarded your efforts beyond your expectations; if you have discovered a new resource of practical value or have developed a new line of industry into a paying proposition—if, in short, you have anything to tell that will serve as additional evidence of California's munificence—tell it through these pages. Send photographs, too, if you have them or can obtain them.

DAIRYING is undoubtedly one of California's most important industries, as the several articles by experts appearing in this number will testify. It is a business affording opportunities at all times, and one not likely to be overcrowded. The demand is always certain, and with careful management and an understanding that will prevent costly mistakes, large returns may be realized. In the Autumn Number of this magazine Mr. Ed. H. Webster, general superintendent of California Central Creameries (who contributes a brief article to this issue), will give a detailed account of the dairying industry from the angle of a practical man who has studied the business in all its ramifications. This article will be exhaustive and will undoubtedly be of great value.

THE State of California is one of the finest examples of the benefits that accrue from an equality of the sexes in matters of business, politics and the general management of the affairs of life. California's women, from the earliest beginnings, have stood shoulder

to shoulder with the men and have had their part in the up-building of the State. They have proved conclusively their splendid qualifications for constructive enterprise; for active participation in all work for the welfare of the community, as well as in the management of the home. Nor is this said in disparagement of women elsewhere; CALIFORNIA'S MAGAZINE is a firm believer in the high qualities of the feminine mind at all times, everywhere. In this number are numerous articles by women of California, showing what they and others have done for the State and for its people. It is the intention to include in each issue articles by, for, and about women in this State, which will serve to encourage those who may be obsessed by a false belief in their own limitations, as well as convince the world of the splendid qualities of California's fair citizens.

"MAKING a Success With a Small Farm in California" is the title of a paper written for the next number by Mr. W. V. Stafford, formerly State Labor Commissioner, from information gathered during his recent travels about the State. Mr. Stafford interviewed many so-called "small farmers" and found numerous instances of unique methods employed in the attainment of success with small tracts of land. The article will be illuminating to those who have labored under the impression that to succeed in farming in California invariably requires a small fortune and many acres of land to begin with.

CALIFORNIA possesses numerous artistic and literary shrines, which, however, are not always easy to locate and are sometimes overlooked even by those most interested in such things. Frequently the searcher is called upon to make a pilgrimage down some half-hidden by-path, or to go delving into the musty archives of the past; again, he may be required, in the pursuit of knowledge about artists and writers in California, to make excursions into the realms of Bohemia, or the fashionable circles of society. In any event, the searcher is generally rewarded for his perseverance by discovering much of interest, much that is distinctive. For California's men and women of art and letters have been nothing if not original. In what other section of the country will you find such striking figures as those which stand in bold relief against the background of California? And there are others, less celebrated, perhaps, but no less picturesque, interesting—typical.

An account of certain rambles in search of shrines of art and letters in California will be published in the Autumn Number of this magazine. It is by Adam Hull Shirk and is written in a style that renders it most delightful reading.

PARTICULAR attention of readers of CALIFORNIA'S MAGAZINE is called to the superior quality of the illustrations in this issue, both in black and white and in the natural color process. The latter are the last word in latter-day engraving art. The fish and game pictures, for example, are declared by experts to be the finest ever produced in the West, if not in the world. The delicate hues in the rainbow trout, for instance, are retained

in lifelike shades. In the fruit plates the actual bloom is apparent upon the satiny surface of the luscious plums, peaches, etc. The scenic pictures, those of the Yosemite Valley, particularly, are wonderfully beautiful and give the person who has never seen this marvel among valleys, a perfect conception of the exquisite coloring. In future issues four-color process plates of California subjects will be made a particular feature, and subscribers to CALIFORNIA'S MAGAZINE will, in a year, have accumulated a splendid series of exceptionally beautiful pictures, worthy of preservation, if only for their artistic perfection. Many excellent photographs for natural color illustrations have already been secured for the Autumn issue.

IT should be apparent to those who read this number of CALIFORNIA'S MAGAZINE that it offers the most convincing evidence of the unparalleled quality of the State as a place for living and working under desirable conditions. Therefore, if you happen to be a resident of this State and have friends in the East, or elsewhere, to whom you have often endeavored to portray the wonders of California, perhaps with an idea of inducing them to come west, and possibly with only indifferent success—you must realize that in this number you have an argument that is convincing beyond anything of the sort heretofore offered. And you need not be afraid to make use of it, because it is authentic; it is stamped with the seal of authority by men who know whereof they speak and who do not speak unless they mean what they say.

Why not, therefore, make use of CALIFORNIA'S MAGAZINE in interesting your friends in California. If you are a loyal Cali-

fornian, you naturally want to attract to the State as many good citizens as you can. And in this Cornerstone Number you have hundreds of pages of convincing testimony to the greatness of California.

THE book review department of this magazine will be an important feature of future issues and will contain unprejudiced critical considerations of the latest publications. Publishers are invited to send books and periodicals to this department for review and may be assured of full recognition of the merits thereof, with, however, just criticism where it seems to be deserved.

THE excellence of CALIFORNIA'S MAGAZINE as a medium for advertising will be evident to those who are familiar with such matters. While this number contains no outside advertising whatever, and has been devoted to circulation building, future issues will carry advertising of the highest character only, which will include no announcements of a speculative or misleading character. Those interested are advised to communicate now with the Advertising Department of CALIFORNIA'S MAGAZINE to reserve space in the Autumn Number.

THROUGHOUT this number are frequent references to the Readers' Service of CALIFORNIA'S MAGAZINE. These are commended to your attention and you are urged to take advantage of the proffered assistance to any extent you may desire. There is no information concerning California, its resources and potentialities, but can be quickly supplied by the Service department, which is made up of trained experts who are for the most part men of almost nation-wide reputation in their respective lines.

“Why California?”

HERE'S a pertinent question: *“Why California?”* Whence the source of our enthusiasm; why the continued repetition of the statement, in varied forms, that California is today the most attractive spot on earth? Have we a reason for the faith that is in us, you may ask? Assuredly, we have. We know—and knowledge is even greater than faith. We know that California is wonderful and that its people are fine and true. And we want the world to know it also. That is why we have employed frequently the slogan: **“TAKING CALIFORNIA TO THE WORLD!”** That is what we are doing—through this magazine and by means of our **READERS' SERVICE**, which leaves nothing undone that will mutually *serve* California and the readers of **CALIFORNIA'S MAGAZINE**.

“But why?” asks someone. “Why California?” And we answer: “Come and see?” Seeing is believing, so they say, but feeling in your innermost soul that a thing is so, is better still. And the Californian, either native or adopted, very soon learns to feel in his innermost soul, to know in his heart of hearts, that intense love of California, that loyalty to the State, that freedom, and above all, that *confidence* which begets *success* and happiness.

California gives everything—everything that man may require. Out of the richness of her store, Mother Nature gives, and gives, and asks in return only honesty and industry and a smiling face and a continual practice of the Golden Rule. In exchange for these simple requirements she gives everything!

That is “Why California”!

What California Needs

CALIFORNIA has everything to offer and all it requires in return is good citizenship. What California needs today is more people, men and women of high calibre; men and women who are industrious, intelligent, with high ideals and a capacity for expansion in the realms of mentality. In a word, it needs more citizens of the same type as those who have made it the marvelous State it is today.

California's Need is the World's Opportunity

BECAUSE California needs that type of men and women, this is the time for the world to take advantage of the need and profit thereby. No matter what a man's station in life, or how much of a success he may have made in his work, California can offer possibilities that no other spot in the world offers. It is the State for the successful man because the successful man can appreciate its blessings and benefit himself and the State as well.

Our Service to You is a Service to the State

CALIFORNIA has a definite proposition for every man. What that proposition is, we can tell you once we know all about you and your desires. That is what our READERS' SERVICE is organized for—to work for the mutual advantage of the State and the readers of CALIFORNIA'S MAGAZINE. The blank for registration on the last page of this number merits your consideration. Fill it out and mail it to us today. It may result in great benefit to you and yours.

Readers' Service - California's Magazine
NEW CALL BUILDING, SAN FRANCISCO

California Fruits

and How to Grow Them



A Manual of Methods Which Have Yielded the Greatest Success; with Lists of Varieties Best Adapted to Different Sections of the State.

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Author of "California Fruits," etc.

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It treats of the proper culture of all leading vegetables in California. It is full of information and instruction. It is simple, direct, and so clear that whoever uses it as a guide book cannot go astray in vegetable culture.—Sacramento Record-Union.

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By EDWARD J. WICKSON, A. M.,
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By SUSAN SWAYSGOOD

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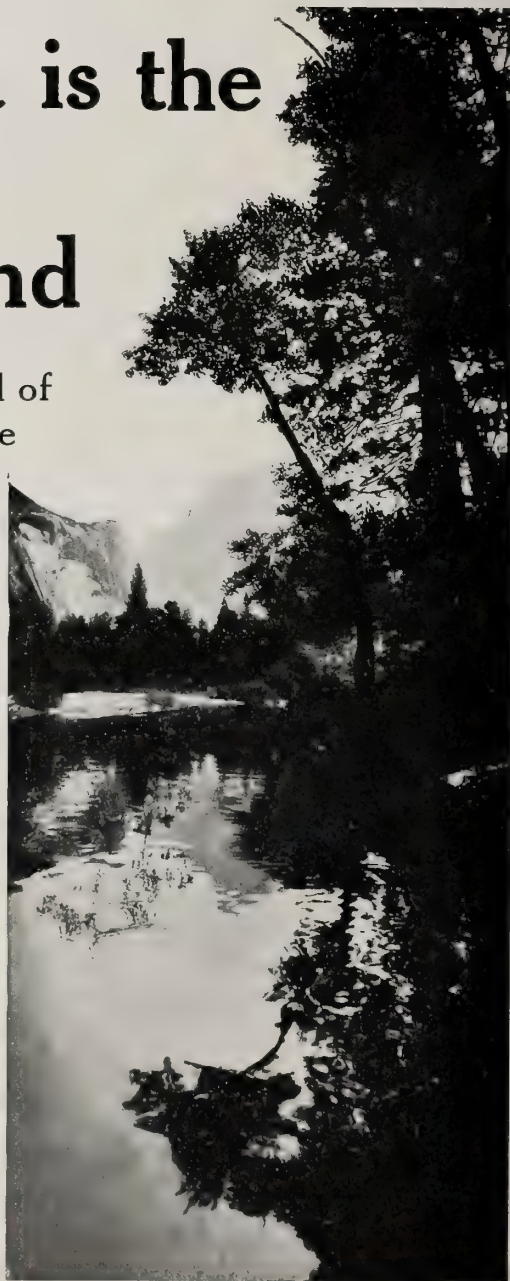
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"Tomorrow to fresh woods and pastures new."—Milton.

Come, then, if you would find the hiding place of the great god Pan and his followers today—for here is Arcady!

California is the World's Playground

IT is the modern land of Romance, but unlike some of the romantic countries of the Old World, it mixes commonsense with its idealism and never loses sight of the practical. Californians have learned how to dream practical dreams; how to realize ideals, and how to make their work joy instead of drudgery. Also they have learned the necessity of mixing play with their work.



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Communion with her visible forms, she speaks
A various language. . . ." —Bryant.

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Vacation in
California all
the year 'round*



*There is
every variety
of Scenery to
be found in
California's
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square miles
of territory*

IF YOU HAVE DREAMED OF COMING TO CALIFORNIA LET US TELL YOU HOW YOU MAY
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is devoted to the dissemination everywhere of information of
authentic character concerning California

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who are seriously considering California as a scene for
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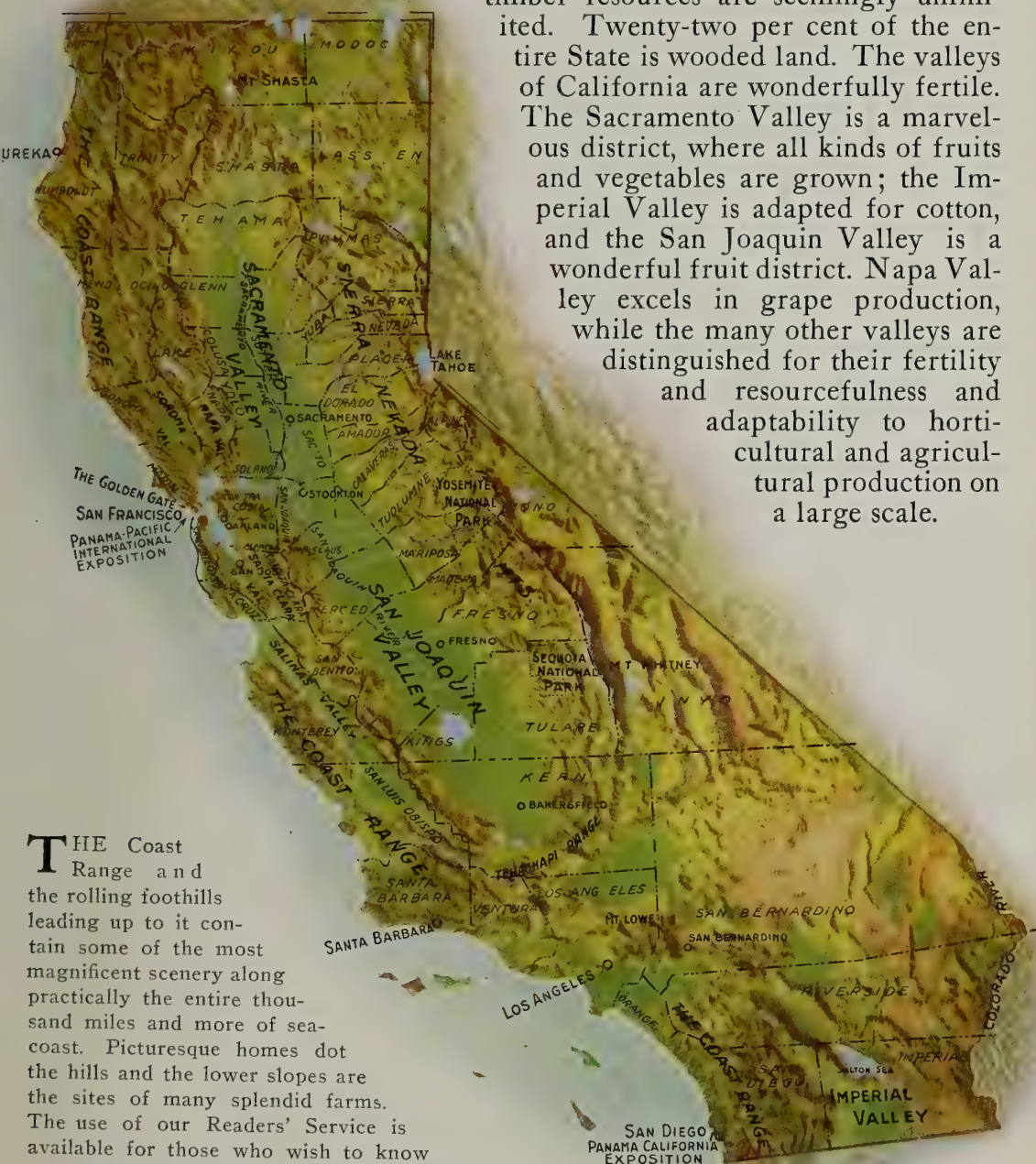
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CALIFORNIA'S MAGAZINE

NEW CALL BUILDING, SAN FRANCISCO

The Mountains and Valleys of California are shown on this Relief Map

THE highest peak in the United States is Mt. Whitney, in California, which rises to a height of 14,502 feet. Mt. Shasta is 14,390 feet in height. The Sierra Nevada and Coast Ranges afford unexcelled opportunities for climbing, hunting, motoring, etc. The timber resources are seemingly unlimited. Twenty-two per cent of the entire State is wooded land. The valleys of California are wonderfully fertile. The Sacramento Valley is a marvelous district, where all kinds of fruits and vegetables are grown; the Imperial Valley is adapted for cotton, and the San Joaquin Valley is a wonderful fruit district. Napa Valley excels in grape production, while the many other valleys are distinguished for their fertility and resourcefulness and adaptability to horticultural and agricultural production on a large scale.



THE Coast Range and the rolling foothills leading up to it contain some of the most magnificent scenery along practically the entire thousand miles and more of sea-coast. Picturesque homes dot the hills and the lower slopes are the sites of many splendid farms. The use of our Readers' Service is available for those who wish to know more concerning the characteristics of any section of the State. You should register with us today.



**The Canyon of the Yosemite: In the center of the great National Park is the Yosemite Valley, which Edwin Markham truthfully terms "One of the sub-
limities of the world."**
Courtesy of the Santa Fe Railway Co.

What California *Can* *Do* for the World

By Dr. David Starr Jordan

Chancellor of Leland Stanford Junior University

Editor's Note: Doctor Jordan is too widely and well known in world circles to warrant any attempt to characterize his qualities and public services. Still for the benefit of the distant reader it may be said that he is distinctively a Californian in his experience, in the development and quality of his activities, and in his spirit and achievement. In pursuit of his lofty purposes he has never been known to take water—except at the very beginning of his scientific career when he chose to study the denizens of the mighty deep as his line of systematic and biologic research. Since then he has had most to do with men on their educational, religious, and sociological relations and from the organization of a great university to inspire and equip the youth for world purposes he has naturally passed to exhortations and warnings to the adult world to behave itself. Naturally, also, he finds that California has a unique duty and opportunity in this line.

JUST now the world is mainly in need of two things—sanity and food. War is insanity, anarchy, disregard of morals, of law, of common decency generally, and just now is on the largest scale the world has ever known for that sort of thing.

Europe is not much larger than the United States and holds no greater variety of soil, products, or population. The thirty, more or less, of the states of Europe are shut

off from their neighbors by an excess of armed men. This, instead of being simply a police force obeying the decrees of a civil population, has come to exist for its own sake; in many nations to the utter neglect of the interests of the people it pretends to serve. The existence and maintenance of a dominant military caste, engaged in rivalries and anxious to try out its new guns, its new tactics, its Zeppelins, dreadnaughts, and submarines is the sole necessary cause of war. The immense profits in the making and equipping of these hideous tools of scientific savagery is one of the most powerful of the incentives which help on war. With this goes the fact that, on the continent, personal liberty has vanished, leaving every man a soldier. To keep up these costly agents of ruin it is necessary to load the borders with hate and to emphasize to the utmost any chance difference between nations by speaking of it always in terms of war. Never in the world would commercial jealousies bring on war if it were not that each adventurer or exploiter is backed up by diplomacy, and the foreign offices of most nations are only the firm names under which exploiters carry on their business. On top of this every diplomatist is backed by the army, and his every word is loaded, on the principle of the brass knuckles, with the threat of war.

It is therefore not strange that we have war, even though overloaded Europe is in no position to pay for it, having already, through loans, expended the gains of ten coming generations. The remedy for this is the one found by our forefathers and followed by the provinces of Canada and the states of Australia and South Africa. If the European civilization of the next century is not to go the same hideous way it must not be founded on dynamite. It must not rest on force and fear and hate and lies. In

some degree it must be a democratic federation. In our own federal union each State gave up the right of war and of separate meddling with international affairs. We have free trade among the forty-eight States, the largest scale on which freedom of trade has ever been tried, and we have interstate citizenship. Something of the kind must come to Europe, else she will tread the road to bloody ruin again. After that she would have to be re colonized from America, as she is now being fed by the people of her daughter continent.

Given a tribunal to adjust international disputes, free trade among European states and an international citizenship, and it would be very hard work to keep up in Europe the spirit of rivalry and hate.

This lesson, California, with her sister States, is prepared to teach. Under the flag where hatred dies away this single State offers all the variety seen in Europe. It is the overflow meeting of all the nations, and to this meeting all come in peace and in mutual tolerance and respect. "I can not," said Charles Lamb, "hate anybody I know," and here in California we all know each other. And we all love California because she first loved us.

And as California has fed us so bountifully we shall be ready to share her bounty with starving Europe. Already the Belgians, led by Herbert Clark Hoover of Stanford University, are our world guests. As the pitiful struggle goes on to its final end in drawn game Poland, Servia, Hungary, Turkey, Alsace, Macedonia, France, must appeal to our charity. Later England and Germany, perhaps. We of California will know where our duty lies, and we shall not be remiss in our devotion to it.



Mighty Monarchs of the California Redwood Forests—a scene along the line of the Northwestern Pacific Railroad

The Human Factor in State *and* National Development

By Hon. Franklin K. Lane

Of California; United States Secretary of the Interior

Editor's Note: The case for the farmer is taken up by Honorable Franklin K. Lane in his article, which analyzes the burden of those who are attempting to make homes and discusses what help and vantage can be given them in the public interest. Mr. Lane is a Californian; he is also a big, broad-shouldered, strong-minded citizen who was a power in the interstate commerce commission, and is now a power in the interior department. He is a rational reformer, a far-seeing constructionist. He has the courage of his convictions. Not so long ago a prominent writer declared after an interview that "Frank Lane is one of the very few really big men in Washington." Mr. Lane represented the President at the opening of the Panama-Pacific International Exposition. He is at the forefront in world movements. His article is a valuable consideration of a vital topic.

LARGE questions are in their ultimate simple questions, just as large men are simple men, men without complexity. That seems to be the order of our day.

There is very little difference between deciding what should be the proper interpretation of a statute of the United States Congress and deciding what should be the proper construction of a section of a city charter. The same kind of intellectual grasp that will solve a problem in any city or in any state will solve a problem in the nation.

The problems that I have in the Department of the Interior are largely problems that turn upon standpoint. What is the thing to be done? And in whose interest should we work? There has been all through the world the theory that resources should be given to those men who

can make largest use of them; and that in some way the benefit of those resources will trickle down through some sort of sieve to the great body of the people; that we would be better off if we consigned all that we had to some great master of industry and let him, in his infinite wisdom, take care of the mass of people underneath.

That is a philosophy under which a great deal that is good has been done, under which continents have been opened, under which the resources of great bodies of land have been made available to the people of the world. But it is not a philosophy that is consistent, I take it, with the theory of our government or the tendency of our laws.

Just as soon as we accept the theory that all men and all women, if you please, are entitled

to participate in government, there must necessarily follow the proposition that all people have a right to say something as to what their economic and industrial possibilities shall be. So that it is no longer possible, no matter how advantageous it might be from the standpoint of efficiency or speedy development—it is no longer possible to turn over a bit of our continent to a few men and say "Develop this as the East India Company developed India," or as Cecil Rhodes planned to develop Africa.

TRUE MEANING OF SERVICE

We think largely today in terms of economics, and the average man, and the man who is not of the average, believes that it is possible for him in some way to work out an economic and industrial philosophy by which advantage will come to him and to the great mass of our people, even though there is no such thing as putting the master mind to work upon the problem excepting as the servitor of the many; and the problem of our government largely is to so stimulate the imagination of these master men that they will be able to appreciate the glory that is theirs and the fullness of the life that they are leading if they are able to serve all men instead of themselves alone.

The difference between men, I find, is largely a difference in imagination, a difference in vision. Some men see themselves as units, isolated, removed; other men see themselves in a relationship.

The world is developing in England and in the United States a class of rich men who have as much satisfaction in doing good with their money as any poor men who live, and not getting that satisfaction like those, as John Boyle O'Reilly says in his poem on Bohemia, who deal out "Charity scrimped and iced in the name of a cautious statistical Christ," but men who are not attempting to do anything other than make their wealth available to their fellow men.

It is a wrong economic theory, I am convinced, to say that those men who have grown rich have not served their country well. The money that they have made and the wealth that

they are producing, if that wealth is used constantly in creating more wealth and in taking proper advantage of opportunity and putting that advantage to the benefit of the whole community, is well used—better used indeed than if it is dribbled away in a series of society functions, attended often with approval, because they say that it tends to scatter money.

The use to make of money is to use it; and the use to make of land is to use it; and the use to make of water is to use it; and the problem that we have to solve in this country is how to get men to give to the whole country the benefit of the resources that may be held in a single hand or in the hands of a few, and we can not do that arbitrarily. Men can not have what they are entitled to taken from them by sheer force of the strong arm. We must do it upon some philosophic basis and with reason behind us, because we have got to win the force and the command of public opinion.

WHERE THE BURDEN BELONGS

Now, I find on every reclamation project that the greatest hindrance comes from the man who holds out of use land that should be cut up into small tracts and put at the service of the community. I shall try to solve that problem by placing burdens upon that kind of men which are not to be borne by those men who are honestly attempting to make homes; so that men shall have to pay to the government of the United States more promptly their payment for water that we furnish to them if they do not use that water than they would if they did use that water. And so it is with the problem of water power. The question is still undetermined as to what control Congress has over this question of water, as to whether all the water that falls into the state does not belong to that state. There is a claim advanced seriously by some of our states, and ably upheld in argument, that all the water that falls within a state belongs to it, regardless of the condition that would result in the neighboring states if all that water was appropriated by that state.

I come against the problem as to what terms public land shall be allowed to be used for reservoir sites on and for dam sites, and I am

trying to adapt that same philosophy to the water question that I shall try to adapt to the land question; that primarily the body of that water must be used, that you can not take a stream that is capable of producing 100,000 horse-power and by appropriation and by a partial use keep the public from the benefit of the full hundred thousand horse-power, but shall impose upon those people who ask for that river or ask for that dam site an obligation to develop to the highest the water power in that stream.

I do not know that I can suggest anything more helpful than the thought addressed to those who live in the city that the things that make life so tolerable in city homes, come out of the travail of a great body of our people of whom I have seen but little in my life until the very recent years—our farming population.

THE FIGHT FOR A HOME

Some time ago I was in Wyoming upon an irrigation project, where they told me that the previous year the average growth per acre was \$11, out of which the government asked \$1.50. And one after another of those men rose in the meeting and told me of the struggle that they were having in making homes for themselves. One young fellow said that he had five acres. He rose at three o'clock in the morning; he worked until seven; at seven he went to work for a neighbor; he stayed at work for him until six; he had his supper and he went to work again, and he worked until eleven o'clock. Another man, with ten acres, said that he was milking eight cows and keeping two horses upon those ten acres of land. Another man, with forty acres, told me of the struggle that he had had with a piece of sandy soil. He had poured water onto it until he had put twenty acre feet of water onto that land, and yet he had not been able to raise a single crop of alfalfa; but his heart was still full of hopes. He had turned over the sand in his front yard and laid tarred paper a foot and a half below the surface of the soil, piled back the sand and put on water and raised his vegetables.

These are the men who are working for us.

These are the men who are doing the pioneering in the United States today.

The engineering work of the United States is unsurpassed. There is no greater tribute that can be paid to the American engineer than to say that he has built the dam that will hold the flood waters of the greatest river in the country. But we have been indifferent, too indifferent to the man who works upon the farm that is irrigated by the United States. We have been too indifferent to the man who works upon every farm, and I am satisfied that there must come a movement in our time by which conditions will be made more tolerable not for that man alone, but for the woman who is with him. They are the pioneers. I have been through the arid West where these farms are being laid out, dry farms and irrigated farms, and those men are having a battle with the soil that is just as real and just as splendid and calls for as much heroism as any battle that men ever fought upon a battlefield with guns.

There are two classes of men, Kipling says. He divides them into the sons of Mary and the sons of Martha. Mary pleased her lord and he looked upon her with favor. Martha displeased him because she was at work; and the sons of Martha have been working for the sons of Mary ever since. And the man that we must have regard for in our study of economic questions, the man that the government should look to constantly and whose concerns should give the government concern, is that son of Martha who is struggling and striving to build the railroad, to build the irrigation ditch, to make the farm, to get the metal out of the mountains, to drive his ships across the sea, to explore in far-off Alaska, to drain the everglades of the South, to climb into places that are the highest, and find where men can make habitations for themselves. All our economic theories must be controlled, curbed and limited by the human equation. There is no philosophy that solves any problem unless we consider first of all how men are going to live, and what their ideals of living are; and if we are to have the United States.

filled from shore to shore with men who are independent American citizens, proud of that citizenship, loyal to their government, we must have conditions in the homes of the farmers of this country under which women will not work from four in the morning until nine and ten at night, and men will find that they can get some of the satisfaction that comes to men by mixing with their fellowmen without abandoning their farms where they are trying to make a living for themselves as well as for us.

HOW THE FARMER FEELS

I want to make a plea for consideration of the problem of the American farmer; as to how he is to become identified with those who live in the city and not feel a degree of bitterness against them. I find that there is building up a great class feeling in the United States, and that feeling some say lies at the House of Have on the one side and the House of Want on the other; and the minds of some, it is roughly believed, say that this means the labor unions or the laboring men on the one side, and the capitalistic class on the other. I say seriously that one of the problems that must be considered is the problem of the dissatisfaction of the man who lives in the country, and that

there is as much danger of a philosophy developing on the part of the farmer that is antagonistic to the denizen of the city as there is that laboring men will be opposed to the capitalist. Those men feel that they have not had out of this country a square deal. They are willing to work, but they feel that an effort ought to be made to make their conditions more tolerable. Men on the farms in the United States pay ten and twelve per cent interest upon their money, when they want to buy a few cattle or some agricultural implements, and they say the man in the city can get his money for five per cent, and what is the city man doing for them, what consideration does he give to them?

This country is great; this country has a destiny that is unequalled, but that destiny can be worked out only by having in our minds constantly "the other fellow." That other fellow is the man upon whom we must lean; we must not try to solve problems upon any theory unless we take into consideration the psychology of the man who has to work the farm and the psychology of the man who has to sail the ship, and the psychology of the man who has to do the work in the machine shop or in the ground.

CALIFORNIA is a State where men may come nearer to realizing their ideals of life and work and that in a shorter space of time than almost any other place in the world. The problem of the American farmer is less a problem here than elsewhere but it is still a problem, just as the life and labor of any proportion of the human race must ever be. But the California farmer finds many of his problems solved by Nature herself; finds also that there is less manifestation of "man's inhumanity to man" and more general observance of the golden rule. The true life of the farmer—which entails peace of mind and happiness as concomitants of prosperity—is lived under California skies as nowhere else and the farmer of this State takes his place in the front ranks of the world's producers. There are thousands of persons who will read this and who will find their minds revolving questions that insist upon elucidation. "How can I know more of California?" "Where can I obtain information I know is dependable?" The service department of CALIFORNIA'S MAGAZINE is organized for the very purpose of answering just such questions. Readers of this publication are urged to put their problems up to us for solution.

Labor Conditions in California

By W. V. Stafford

Formerly California State Labor Commissioner

Editor's Note: Mr. Stafford's subject is one appealing to the human sympathies as few others can, but it is likewise the most important of all economic problems. Labor in California is more greatly blessed than in most places, and Mr. Stafford gives facts and figures supporting that assertion. As former state labor commissioner he has enjoyed exceptional opportunities to become personally acquainted with the conditions which he describes in his usual pithy, terse and "straight-from-the-shoulder" manner. The subject of labor is a vital one, and every person who thinks at all will see its significance in relation to the future development of the State in the face of present-day conditions.

ONE of the first essentials for comfort for the man who toils is a climate that does not run to extremes. In this respect California is particularly favored; there are few spots on the entire planet where men can work as many days in comparative comfort as in this State. While California, with a coast line of about one thousand miles, with large interior valleys, and with high mountain ranges, has a variety of climate that embraces every gradation between the two extremes it is a fact that the major portions of the State's industries are carried on in the sections where the temperature is of the most favored character.

The manufacturing industries are conducted principally around the San Francisco Bay district, and in the neighborhood of Los Angeles—where the climatic conditions for labor are perfect. Other important manufacturing cities are Sacra-

mento and Stockton, where the winter climate is ideal and where the summer heat is hardly ever oppressive and the summer nights are pleasant and cool by comparison with eastern cities. Considerable manufacturing is pursued in a number of smaller cities where the climatic conditions are similar to those mentioned above.

The average number of rainy days in the year 1913 in twenty of the counties, where the larger population and the greatest industrial activity are to be found, is 48. Every other day in the year was either clear, partly cloudy or cloudy—with the preponderance in favor of clear. San Jose had 215 clear days; Los Angeles 193; Sacramento 256 and Riverside 212.

A WHITE MAN'S COUNTRY

California is decidedly a white man's country—the general impression to the contrary, notwithstanding. The Federal

PREVIOUS to the development of irrigation systems employment on the California farm was, for the majority, seasonable and precarious. Millions of acres of wheat gave employment to plowmen and harvesters during the brief periods of planting and harvesting only. Today, with the wonderful systems of irrigation working practically the full length of the State, a competent, steady farm hand has a better prospect for permanent employment than has the factory operative of a manufacturing city.

census of 1896 shows the State population to have been 91.6 per cent white; the same returns for the year 1910 show 95 per cent white, the other five per cent being made up of Japanese, Chinese, Negroes and Indians. Of these it may be said that the Japanese are not increasing, the Chinese are rapidly decreasing and the others do not in either instance represent one per cent of the State's population.

The Chinese have practically ceased to compete with white labor except in city laundries—the Japanese engage principally in house cleaning and domestic service in the cities, and in fruit and vegetable production in the country.

The census reports of 1910 show 7,659 manufacturing plants for the State with an invested capital of \$537,134,000—the product of these establishments being \$529,761,000 for the year, and employing 18,203 salaried officials and clerks and an average of 115,296 wage earners. About 25 per cent of these industrials were located in the city of San Francisco, about 15 per cent in Los Angeles; the remainder scattered all through the State, in the following cities, Oakland, Sacramento, Fresno, Stockton, San Jose, Richmond, San Diego and Eureka, as well as a number of other localities. We may safely estimate that if these figures could be brought up to date they would show an increase of from 10 to 20 per cent.

It is practically impossible to obtain correct figures as to the number of persons employed in all of the varied indus-

tries of the State. Some idea of the labor employed can be formed by a brief statement of the value of the varied products for the year 1913:

Orchard products	\$ 77,796,120
Vineyard	26,875,000
Garden, fresh	9,842,000
Farm products (grains, etc.).....	99,083,000
Dairy and poultry products.....	53,756,448
Other field crops	27,435,800
Fish industry	10,678,534
Forest and lumber (estimated).....	40,000,000
Petroleum	46,000,000
Mineral products (estimated)	54,000,000
Farm animals and products.....	77,584,300
Sundry other products (not included above)	31,600,000
Total	\$554,651,202

These figures, which have been carefully and conservatively compiled, show that California has an income from the labor of her people, agriculture, horticulture, manufacturing, etc., all combined, far in excess of one thousand million dollars annually.

TRANSPORTATION FIGURES SIGNIFICANT

Some conception of the bulk of the business of California may be formed by noting the fact that the steam railroads of the State employ 63,944 men in the varied branches of transportation—with 14,601 miles of track. In addition to the steam railroads, California has nearly 3,000 miles of electric railway.

The report of the State Labor Commissioner for the year 1913 shows that 5,103 mercantile and manufacturing establishments were inspected. These establishments employed 148,549 persons of

whom 110,321 or 73.3% were males and 38,228 or 25.7% females. Minors under 18 years of age constituted 4.8%, while minors under 16 years of age constituted less than one per cent. These figures are all valuable as giving the relative proportions of male, female and child labor in the industries of California.

In an investigation as to wages paid and hours of labor in California industries the Commissioner finds that of 145,154 individuals, 75% were males and 25% females. Of the male employes 1% worked less than 8 hours per day; 36.6% worked 8 hours; 43.2% worked 9 hours; 16.8% worked 10 hours; 0.9% worked 11 hours and 1.5% worked 12 hours. The wages paid were classified in groups ranging from less than \$3.00 to \$25.00 and over per week:

0.01% received less than	\$ 3.00
1.25% received from \$ 3.00 to	5.99
5.3 % received from 6.00 to	8.99
7.8 % received from 12.00 to	14.99
17.8 % received from 15.00 to	17.99
15.3 % received from 18.00 to	20.99
14.8 % received from 21.00 to	24.99
22.2 % received from 25.00 to	28.00 and over.

Of the total number considered, 70% received \$15.00 or over per week.

The female employes were limited to 8 hours per day under the State law—a small percentage working still less than 8 hours. The wages paid females were grouped in the commissioner's report in the same manner as the males and show as follows:

8. % received from	\$ 3.00 to \$5.99
31. % received from	6.00 to 8.99
25.7% received from	9.00 to 11.99
16.4% received from	12.00 to 14.99
9.6% received from	15.00 to 17.00
4.6% received from	18.00 to 20.99
1.7% received from	21.00 to 24.99
2.2% received from	25.00 and over

Of the total number considered, 60% received \$9.00 or over per week.

LABOR ORGANIZATIONS

Labor in all skilled trades is shown by the report of the Labor Commissioner to be very thoroughly organized throughout the cities of the State. He estimates the local organizations as numbering over one thousand, classified as follows: (1) Building stone working, etc.; (2) Transportation; (3) Clothing and textiles; (4) Metal, machinery and shipbuilding; (5) Printing, building, etc.; (6) Woodworking and furniture; (7) Food and liquors; (8) Theaters and music; (9) Tobaccos; (10) Restaurants, etc.; (11) Public employment; (12) Catering, engineering; (13) Miscellaneous. Each of the above dwindling into several units.

The hours of labor in the majority of these trades are 8, with half-time in many trades for Saturday. The wages of bricklayers in the principal cities average about \$7 per day; carpenters, \$4, \$4.50 and \$5; cement workers receive \$5 and \$6 per day as finishers; finishers' helpers, \$4 and \$5 per day and cement laborers, \$3.50 and \$4; electrical workers, \$4, \$4.50 and \$5 per day; lathers, \$5 to \$6 per day—generally

THE discovery of gold brought to California a varied humanity. The Argonauts came from every State in the Union, from every corner of Europe, and from the Isles of Australasia. The Germanic and Latin branches of the Caucasian race were well represented. Later the climate and conditions attracted the Chinese, the Japanese, and even the Hindoo. For a brief period there seemed danger that the Caucasian would be swamped. Wise legislation, however, both State and national, backed by healthy public opinion, brought about the necessary changes and California today is essentially a White Man's country.

working men at piece work, \$4 per M; painters, paper hangers and decorators run from \$3.50, \$4 and \$4.50 for the two former occupations to sometimes \$5 and \$6 per day for decorators and sign painters; plasterers receive \$5.50, \$6 and in one locality \$7 per day; plumbers range from \$4.50 to \$6 per day; delivery wagon drivers, \$18 to \$21 per week; blacksmiths and boilermakers run about \$4 per day; machinists, 45 to 50 cents per hour or \$3.50 to \$4 per day; bakers and confectioners, \$18 to \$23 per week.

These extracts from the statistics on file in the office of the State Labor Commissioner are quoted as giving a range of wages in some industries and can be accepted as an average of the whole. It is impossible to give in detail all the rates in an article of this character.

THE LABOR OF THE FIELDS

About one-half of the labor and production of the State of California is closely connected with agriculture and horticulture. The citrus fruit industry alone employs about 25,000 people, 3,500 of whom are Orientals; 5,000 people are employed in the packing houses of this branch of the State industries, one-half of these are women; men earn from \$1.50 to \$4.50 per day; women are paid the same rates as the men for the same class of work. The citrus industry provides labor for the entire year in degree, when not picking and packing they are busy pruning and cultivating.

The hours of labor vary somewhat in the fruit and farming industries as in the mechanical trades—probably the nearest approach to an accurate statement can be found in the Federal census, which gives the hours of employment for 115,296 persons in California for all occupations: 22,765 persons working 48 hrs. per week and under. 9,652 persons working 48 to 54 hours per week. 34,674 persons working 54 hours per week. 6,968 persons working 54 to 60 hours per week. 31,107 persons working 60 hours per week. 7,125 persons working 60 to 72 hours per week. 386 persons working 72 hours per week. 2,619 persons working over 72 hours per week.

These figures include every branch of industry of which the Federal Government took cognizance and are very comprehensive.

Much has been said concerning the seasonal character of much of the labor in California and undoubtedly in the past that has been a great drawback to men of steady habits. The extraordinary development of irrigation systems and the consequent high class intensive farming and dairying that results, renders the opportunities for steady employment near the reach of all. Therefore, conditions have materially improved in this regard as demonstrated by the following quotations from the last Federal census report. In an investigation as to permanency of employment of 132,280 persons in all industries in California, it was found that they were employed as follows:

January	94,747	or	71. %
February	92,252	or	71.3%
March	100,372	or	75. %
April	108,437	or	82. %
May	115,839	or	87.6%
June	119,911	or	90.6%
July	124,886	or	94.4%
August	131,202	or	99.2%
September	132,280	or	100 %
October	129,804	or	98.2%
November	121,486	or	91.8%
December	110,281	or	83.4%

Eighty-six per cent of these persons were males over the age of 16.

The same persons considered, with those engaged in the lumber industry eliminated, show more favorably still: the lowest per cent being 84% for the month of February and 95% for the month of January. These figures undoubtedly indicate that as California develops her resources the opportunity for permanent employment becomes more assured.

Supplementing the natural advantages, the Government of California has woven protection around those who toil to a degree which is commendable. Under the Workman's Compensation Act there has been reported to the Commission for the first 8 months of 1914—38,512 accidents,

all requiring medical treatment or showing lost time. Of these all excepting 3,174 ceased disability within 2 weeks and so received as compensation, medical service only. Of the 3,174 cases entitled to compensation, 806 were permanently injured and 376 were killed; 450 employers contested, all the others paid without protest. It is the experience of the Industrial Accident Commission that all of the larger employers of labor accept the law as just and fair. The protests generally come from employers of small plants who are unfamiliar with the provisions of the statute and so enter protest. The contestants generally are satisfied after the education that necessarily follows investigation.

Another branch of the State work of protection to labor is carried on by the Emigration and Housing Commission. From April 1st to Sept. 30th, 1914, this

commission inspected 752 industrial camps, the majority of which were railroad construction camps, lumber camps and camps in the hop fields; 53,590 men were employed in these camps. It is needless to say that the enforcement of wholesome sanitary regulation has added much to the comfort of a large army of workers.

Taking all conditions into consideration we may confidently assert that the conditions for labor are by comparison with other states and countries very favorable. For the man who is industrious and who desires to own ultimately his own home, the agricultural sections of the State have everything to offer. Conditions are all becoming more favorable for the man who has industry, ambition and intelligence, and they are becoming less favorable for the shiftless and discontented.

Co-operative Service

HERE'S A TERM as wide as the Atlantic or Pacific, as comprehensive as the mental concepts of the world's greatest thinkers. It means so much that no one page of manuscript could ever convey it all. It means, for one thing, the combined thought of many men all trained in essential component parts of one unit of human endeavor, concentrated in their efforts to serve YOU. It is like the focused rays of the sun upon a given point—concentrated force will move any humanly imposed obstacle, even as right motives and honesty of purpose and labor will remove seeming obstacles which man in his ignorance attributes to spiritual interposition, but which in reality find their source in his own lack of understanding. If your needs are humanly possible of fulfillment, and, as a matter of course, the result of honest desire, then co-operative service will supply them.

California's Promise to Posterity

By Gavin McNab

Attorney-at-Law

Editor's Note: Mr. Gavin McNab sounds a clarion note in his consideration of the future growth in importance of the Western country, California in particular, as a result of the Panama Canal's completion. Mr. McNab is an attorney and has always been a prominent figure in civic enterprises, so that it is not remarkable we should find him as one of the ardent workers for the exposition and one whose voice was lifted with notable effect in behalf of San Francisco as the logical site for the great fair.

THE Panama-Pacific International Exposition is San Francisco's answer to fate and promise to posterity.

More! It is a recognition by the world that San Francisco logically represents the purposes for which the Panama Canal was created—American dominion on the Pacific.

This exposition symbolizes one of the greatest movements of civilization—a mighty shifting of the world's commerce.

What is true of San Francisco, in a larger sense is true of California, and in a greater degree, of the entire West.

If the Panama Canal is to realize the world's hopes, the West will come into its own, and there will evolve a commerce, wealth, and prosperity, creating an empire second to none.

When the world thinks that something will happen the thought generally makes it happen. However, the facts make unnecessary an appeal to hope or imagination.

Where the greatest of continents and the mightiest of oceans meet there must be transacted the business that occurs between the land and the sea.

AN EVERLASTING INVITATION

The Pacific Ocean—God's greatest commercial gift to man—exists as a powerful and everlasting invitation to the enterprise of those who inhabit the richest and most productive portion of American soil.

The canal must inevitably infuse, among the peoples of this coast, the adventurous and spirited of every nation. Here, under favorable conditions, races, in which poverty has suppressed transcendent qualities, will revive and flourish.

Added to the achievements of industry, commerce, and wealth will be the nobler works of humanity—science, literature, and art, adorning a civilization superior to any in the annals of mankind.

At the assemblage on the floor of the Chamber of Commerce, on December 9, 1909, when the citizens of San Francisco inaugurated the movement for the exposition at San Francisco, I said, in an address:

"The world is composed of three classes: One order of men understands what happened yesterday; another, and a better, realizes what is passing today; but the people who domi-

nate the world—who make mighty nations and great cities—are the men who know what will happen tomorrow.”

The “Tomorrow” of commerce for San Francisco and the West must be obvious to all classes of men.

On opposite sides of the Pacific Ocean stand the oldest and the newest civilizations:

To our north, the great Canadian people, certain, with ourselves, to dominate the Western hemisphere, are developing a prosperity and wealth exemplified only by our country;

Under the Southern Cross, in the great lands of Australia and New Zealand, there is rising a greater Britain.

I can not better amplify these views than by the language, taken from the brief, prepared by me for the exposition and used before Congress in the contest between San Francisco and New Orleans for national recognition as the site of the Panama-Pacific International Exposition:

If there is one commercial object more than any other justifying the creation of the canal it is the establishing of American supremacy on the Pacific.

More than half the earth's inhabitants live on lands bordering this ocean. Possessing greatest shore line on the common water, being by proximity and rapid communication in sympathy, and being the most energetic, progressive, and civilized race, the trade of these peoples naturally belongs to Americans.

America's position on the Pacific depends upon the West.

Three great States, California, Oregon, and Washington, constituting the country's Pacific frontage must, forever, be the agents and trustees for the nation in Western seas. America through the great West, and the West through these States, must perform the part for our people in the great contest of races and nations for Pacific control.

Of Western States, California, being the oldest in point of settlement, greatest in area, wealth, resources, and population and having the longest shore line, has been accepted by the entire West to voice its demand that the exposition shall be held on the Pacific Ocean.

The commerce that will make the canal a success must come largely from the resources of the West. The sea does not carry to the land more than the land gives to the sea.

The only great *forests* now existing within our border stand on the Pacific. On them alone will shortly depend America's position in lumber trade.

The greatest body of *oil* known rests in the soil of California. As oil is supplanting other fuel in merchant and war ships the West will have first place in marine motive power and energy.

The *fruit industry* in its variety, from the apples of Oregon and Washington to the oranges of Los Angeles, has grown to enormous proportions, steadily extending itself throughout the markets of the world; while the *fisheries* from Alaska to the Gulf of Lower California have long been a large part of America's trade.

But why detail the immense resources of the West that make it the white man's opportunity? The vast acreage of unused lands, the latent powers awaiting population to quicken into limitless wealth and commerce are here as nowhere else.

To the intelligent, thrifty European, who so rapidly becomes an ideal American, the opening of the canal, with its lessened cost of steamer passage, means new life, hope, a new world, a higher civilization, rich in usefulness and happiness. The hands and the lands will be brought together under the dominion of sound minds. Only in the West can America make this offering.

“WHEN A FIRM, decisive spirit is recognized, it is curious to see how the space clears around a man and leaves him room and freedom.”—*John Foster.*

The Call to California

First Call to California—PHILANTHROPY

In 1768 the Padres lifted The Cross at San Diego and pursued their patient labors for the uplifting of the Aborigines until they had established twenty-one missions, at all of which the principles of religion and the arts of agriculture were inculcated.

Second Call to California—WEALTH

In 1848 the discovery of gold called the world to California and the foundations of our cosmopolitan citizenship were laid by the Argonauts of 1849. Since that date California has produced a total value of \$1,608,539,547 in gold and silver alone, while during the year 1913 the total mineral products, including oil, reached a value of \$100,000,000. Although mineral products are the historic basis of California's wealth production, the more recent and diversified production in agriculture, manufactures, etc., reached a value ten times greater—giving the State an income of over a billion dollars in 1913 from its various products.

Third Call to California—HEALTH

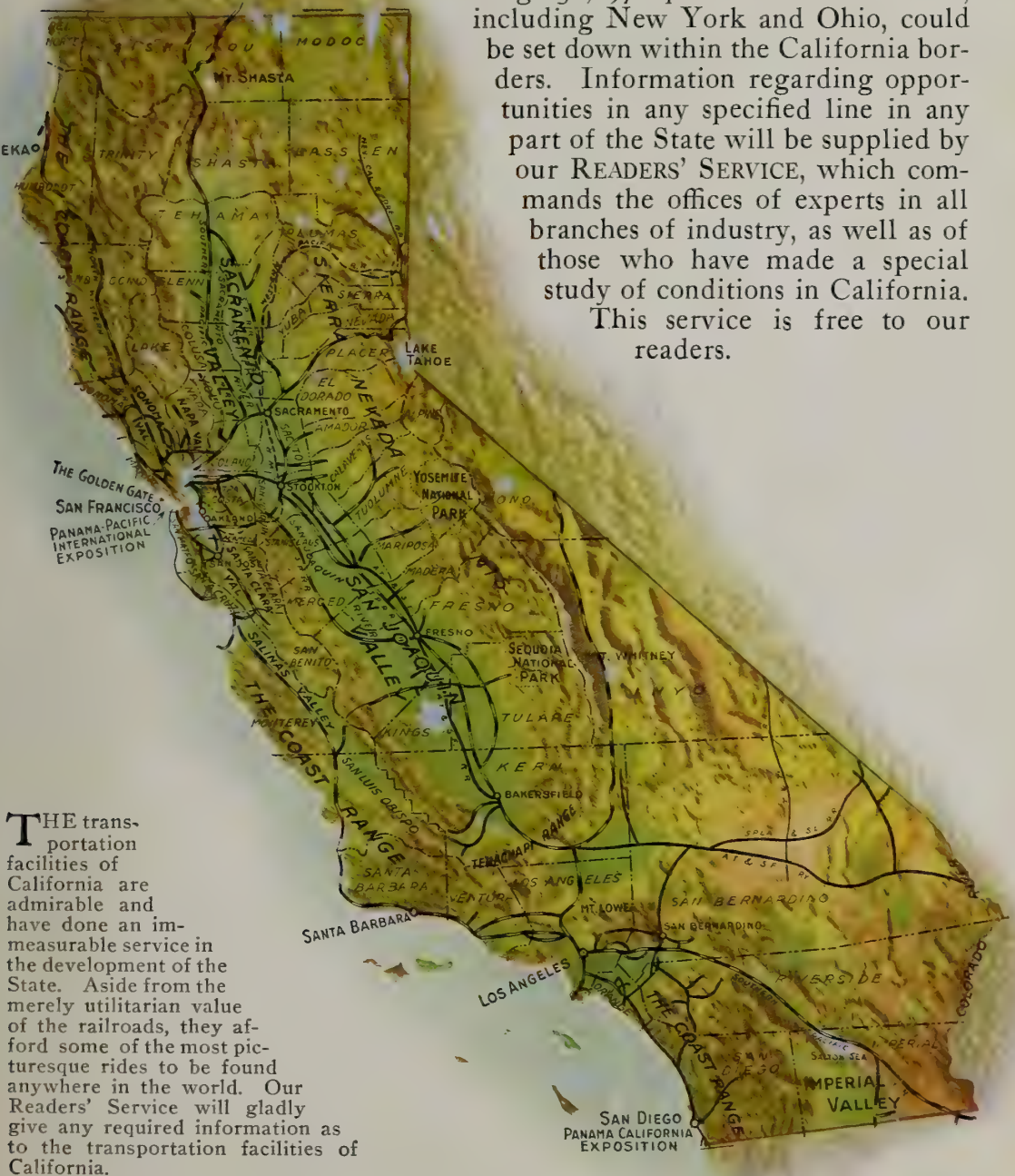
The service of California to those whom strenuous life in trying climates had rendered worn and weary in mind and body, is beyond all valuation. Many have journeyed to California to die, but arrived to live: yes, to live and work and to build up the State in all ways. California gives health to those who live aright—for their sakes and for her own advancement.

Fourth Call to California—HOMES, OPPORTUNITIES, CITIZENSHIP

In the present stage of her development, California adds to all the foregoing gifts to mankind for the higher joy of living, a heartfelt welcome to a well developed and progressive commonwealth, leading her sister states in per capita endowments for culture and in maintaining high standards of morality; in affording opportunity for open-air life and work, for profitable investment, for unique and satisfactory enterprise, for the making of homes and the enjoyment of them. Last and highest of all, California welcomes all to a citizenship in which the sexes are equal—working and voting for the things which seem to each man and woman best for mankind.

Map showing Counties and Railroads of California

IN California are fifty-eight counties, and each one possesses some individual characteristic which renders it distinctive in a particular line of industry. Perhaps it is soil or climate; perhaps a natural resource or again suitability to some special branch of manufacture. California in area is second in size in the United States, containing 158,297 square miles. Ten States, including New York and Ohio, could be set down within the California borders. Information regarding opportunities in any specified line in any part of the State will be supplied by our READERS' SERVICE, which commands the offices of experts in all branches of industry, as well as of those who have made a special study of conditions in California. This service is free to our readers.





Courtesy Raymond Granite Co.

**Hearst Memorial Mining Building at the University of California, built by Mrs. Phoebe A. Hearst,
and which cost, including equipment, more than \$700,000.**

What California Is Doing in Education

By Hon. Edward Hyatt

State Superintendent of Public Instruction

Editor's Note: There are few subjects that today command the interest of the man of family so deeply as the quality and purposes of education, and in this respect California is particularly favored. A system of the most thorough character provides facilities for learning not only in the larger cities and towns of the State, but even the most remote rural districts. Higher education, as well as elemental, has been provided by the State, and State Superintendent of Schools Honorable Edward Hyatt is a recognized leader in both the method and spirit of the State work, which he treats with understanding and sympathy in the present paper.

PEOPLE who think of moving to a new region are almost sure to inquire, "What kind of schools have they there?" before they go far toward acquiring a home.

It is safe to reply to those who ask this question of California: "The best schools you ever saw in your life!" The answer will probably be correct, even though the inquirer comes from the rich State of New York or the classic environs of Boston.

The most striking characteristic of those schools perhaps lies in the provision and care for the children in the remote rural regions. No mountain top is too inaccessible to have its school; no plain too distant; no sage brush desert too far removed. Wherever half a dozen children dwell, there you find a district school. And, mark this—this remote school, so far away, so small, so weak, has a standard school house, a standard

teacher, a standard equipment and a standard length of term. The chances are that the building will be neat, well-painted and comfortable, even if it harbors only a half a dozen lonesome children. Certainly there will be eight or nine months of school in the year. The teacher will surely have the same education and the same certification as in the proudest city. The books, apparatus, and other educational appliances will be of the same character as in the populous centers. It is the idea of a generous state that one child is as good as another, no matter where he happens to dwell, and that it is our duty to guarantee the rudiments of an education to every child within our borders, even on the mountain top, the deep tangled wildwood or afar on the lonesome plain.

GENEROSITY OF CALIFORNIANS

The expense of all this, mind you, does not fall upon the parents of the children

or upon the residents or property owners of the local district. It is provided by the general tax upon State and county. The rich cities, with their banks and warehouses, and teeming crowds, must contribute to the preparation of the remote rural children for citizenship and life.

In the towns, villages and well-settled fruit and farming regions, educational conditions are correspondingly easier. No people anywhere in the world are more free-hearted and generous to all good things than those of California. Descended from the hospitable and open-handed Argonauts, their generosity still abides. Beautiful school houses dot the landscape everywhere. High schools, normal schools and other higher institutions abound. The newer structures are palaces, veritable palaces of education, built by skilled architects, in classic designs, of permanent materials and fitted with lavish laboratories, work-shops, class rooms, and everything else that can add to the opportunities for the training of youth. Truly it has been said that the college of yesterday is the high school of today. Nowhere is the change and advance in our mode of life more manifest than in our schools.

The city of Sacramento, less than a decade ago, built a magnificent \$250,000 high school, intended to take care of the city's children for all time and it was bitterly opposed by many people as being unnecessary as preparing too far into the future. At once it filled up and overflowed. Other structures were added, clear around the block—already they have filled up and overflowed, and another new and splendid building is preparing, in another quarter of the town. And the end is not yet.

SCHOOL BUILDINGS FIRST

This experience in Sacramento is duplicated in many another city, Stockton, Marysville, Oroville, Red Bluff, Woodland, Berkeley, Richmond, Riverside,

Santa Ana, Santa Monica, Monrovia, Oakland, Pomona, Redlands, San Diego, have all been notable for school improvement during the immediate past. A town of a thousand inhabitants thinks nothing of spending forty, sixty, a hundred thousand dollars for an educational plant. High schools are in every county. Splendid normal schools in different parts of the State prepare the teachers for the surrounding country. Business colleges are in all the larger cities and a large State industrial school is at Ione; another at Whittier. Many of the high schools are accredited and lead directly to the State University at Berkeley, which takes rank as one of the greatest institutions in the United States.

One of the striking original features of the California school system is its plan of furnishing textbooks to the children. This is the only State in the Union that manufactures its school books in a state printing office and distributes them free to the boys and girls in the schools. It may be imagined that there were many obstacles and difficulties in the way of this plan. The original enterprise was marked by most strenuous opposition, abuse, vituperation, from every quarter. It was started nearly thirty years ago and has had many ups and downs as time has elapsed. It was handicapped for a long time by poor books prepared by local people; by uneconomic methods of production; by political interferences of one kind and another. All these difficulties, however, have been met and disposed of as they came up, and at the present time the school book enterprise is in admirable condition and is regarded as a successful and beneficial institution by the people of the State. They would not do without it.

The books are chosen from the best of those published in the world. The plates and rights are leased from the publishers for four year periods. The

books are printed and bound at the State printing office at State expense and they compare favorably in workmanship with those in the markets of the country. They are then distributed free to the children, upon requisition from teachers, principals and superintendents, showing the needs of the schools. This gives great relief to the parents and saves much trouble to the teachers, and makes a relatively small expense to the State. The cost of furnishing the 400,000 children with school books is less than \$200,000 yearly.

AGRICULTURE AND EDUCATION

There is a great growing belief that the schools must become more closely allied to the industries by which the people live. Particularly in California schools must be open to the genius of agriculture. It is highly desirable to build up a spirit of sympathy for agriculture in the minds of all the people and to bring them into actual contact with the agricultural life. For many generations everything in education has tended away from the farm. The district school never does one thing in its course to prepare the boy or girl for living on his or her father's farm. It always heads him rather toward clerical or professional pursuits in the cities.

A movement has started in the prune orchards of the Santa Clara valley that bears so directly on these educational questions that it is here illustrated to show what is being done to solve them. The idea is to enlist the interest and the labor of the children and the people of the villages and towns in the harvesting of our perishable fruit crops, paying them full market wages for their work, furnishing them safe and attractive camping places, facilitating their coming and going, and giving them a season of healthful, active, outdoor life.

THE SEASON OF HARVEST

This is a practical course of study in

California agriculture that may well command the co-operation of the educational forces of the State. The school term may very well begin and close so that the children and their parents can take part in the chief industry of the neighborhood. The chief hardship of the fruit grower is the lack of labor for the gathering of his crop. This it is that brings unasimilable foreigners upon us: Japanese, Hindoos, Chinese. This it is that is forcing much of our richest lands into the hands of aliens. The safety of our nation lies in having our land owned by our own people who can earn their living from the soil. It is a splendid thing to see the schools closed and the villages depopulated during the harvest season; to see the mothers and the children living outdoors for a time and helping to pick the hops, gather the grapes, dry the peaches, take care of the prunes, apricots, tomatoes, and all that. It makes stronger, happier, more wholesome people. Everybody may well join in it. There is no loss of dignity in it. It advances the interests of California's greatest industry, the industry by which we must live for centuries into the future, with the world for a rival. It is truly educational, in the best and highest sense.

The school garden is another idea along this line that is spreading all over the State, and it is a most delightful and practical method of approach. Not all teachers have the knowledge and sympathy that makes for the highest success, but nearly all come of ancestry that lived by the soil; and if their minds are open, their hearts willing, the old interests will come back, and there are not many children who fail to respond.

The following tables will serve to give some idea of the wonderful growth of the elementary and high schools of California during the past few years.

Tables Showing Growth of Educational Institutions in California

ELEMENTARY SCHOOLS

	1907	1914	Gain Percent.
Number of teachers	8,246	12,266	48
Number of pupils enrolled	294,385	422,029	43
Average daily attendance	234,624	319,229	36
Number enrolled per teacher	35.7	33	....
Number of graduates	12,683	24,780	92
Amount of State aid given	\$3,977,295.40	\$5,358,579.04	35
Amount of County aid given	2,866,479.17	4,980,197.76	73
Amount of District aid given (special taxes)	937,001.16	4,591,921.29	390

HIGH SCHOOLS

	1907	1914	Gain Percent.
Number of schools	179	255	43
Number of teachers	1,188	2,997	152
Number of pupils enrolled	25,578	65,927	139
Daily average attendance	22,333	48,312	116
Number of graduates	2,890	7,477	158
Amount of State aid given for year	\$ 237,016.77	\$ 642,815.52	171
Amount of District aid given	2,026,685.50	5,506,429.22	172
Amount bonds voted	429,576.50	1,893,657.00	341

The growth of our normal schools is also worthy of note, and serves to show how we are doing away with the old haphazard method of obtaining our teachers. More and more our schools are being taught by specially trained teachers who are in touch with the most

modern educational methods and are thus able to assist their pupils to make the most of the time they spend in the school-room. The following table will illustrate the rapid growth of the normal schools and their attendance:

NORMAL SCHOOLS

	1907	1914	Gain Percent.
Number of schools	5	8	60
Number of teachers	116	229	98
Number students in Normal proper	1,769	3,994	126
Number of pupils in Training School	2,109	3,068	45
Number of graduates	478	1,538	222
Total receipts	\$ 415,012.46	\$1,056,998.51	154
Total expenditure	274,785.71	516,389.90	81
Valuation of property	1,149,766.00	2,392,214.00	108

Thus the prospective home-seeker may make his mind easy over the schools of this great and growing State. The little children, no matter where they live, are given good grammar school education. Those who can go further along the road to learning are always within reach of a good high school. If they choose to go still further, normal schools and universi-

ties are within their reach. The school system of California has been rated as third by the Russell Sage Foundation among all the states of the Union. Certainly this remarkable position among the galaxy of states is a guarantee of the highest educational opportunity to all who live within our boundaries.

The University of California

By Victor H. Henderson

Secretary of the Board of Regents, University of California

Editor's Note: Mr. Henderson is a graduate of the University of California and has therefore been a student of its scope, purposes, and duties and relations from his youth up. For a decade he has held the important and influential position of secretary of the board of regents—a distinguished body which is charged by the law with direct management of the university and not merely with honorary relation thereto. This experience has given Mr. Henderson most intimate knowledge of the internal affairs of the institution, to which he has added, by his own insight, zeal, and loyalty an understanding of the breadth and character of its relations to the varied interests of the State. These facts will assure the reader that the statement by Mr. Henderson is authoritative as well as masterly.

THE University of California is second in size of American universities. In undergraduates, enrolled for a full four-year course, it is largest of them all. And in quality it is recognized as belonging to the first order.

Tuition is absolutely free for all Californians. Women enjoy precisely the same privileges as men—except military drill.

This marvelous growth in a few short decades is due to the fact that the State has always been resolved to have the highest type of university, not a utilitarian makeshift; to the fact that private generosity has given many millions to help the cause of learning, and to the fact that the people of California are eager that their sons and daughters shall have all the training for life that ambition, intelligence, and zeal may win them.

The university started right. It was begun

in 1860 as a classical college of the traditional New England type. In 1868 the State took over this "College of California," endowed it with the national land grants, and provided tax support which has waxed ever more generous.

To the fundamental instruction in the humanities and pure science were added courses in mining, mechanical, electrical and civil engineering, applied chemistry, and agriculture. Professional schools were developed of law, medicine, pharmacy, and dentistry, and a graduate school established.

With the arrival of Benj. Ide Wheeler, formerly professor of Greek and comparative philology at Cornell, to be president of the university, in 1899, came clear and definite declaration that the true university must be a home of productive scholarship, where students may learn how to advance the boundaries of knowledge, receiving their training from

men who are themselves continually seeking to win new truths from the unknown.

PUBLICATIONS DEPARTMENT

The establishment of a liberally supported publications department, devoted wholly to the issuance of publications which constitute an addition to the world's stock of knowledge, proved a vigorous stimulus to original research, for it insured a means whereby the investigations of creatively minded men in the faculty and in the graduate school might be made available for the world interchange and co-operation of science.

The atmosphere of research prevails in the university. Immediately applicable to human needs is a vast proportion of the investigations so vigorously prosecuted by the College of Agriculture. In other realms of science constant achievement is being made in knowledge of the processes of nature, and in the fields of history, economics, anthropology, philology, and the social sciences in general, new light is being thrown on what man has been doing in the world and which way advancement lies.

Many important fields of research have been entered upon through facilities afforded by specific endowment. Thus James Lick gave to the university the Lick Observatory on Mount Hamilton, the foremost center of astronomical investigation in the world today, where, for example, Director W. W. Campbell has proved such memorable discoveries as that the older a star the swifter its motion, and that the planetary nebulae move more swiftly than the swiftest stars themselves, a discovery which seems to show that the old nebular hypothesis was based on error, and that the planetary nebulae are really farther along the path of evolution than the stars, and not an antecedent form from which the stars are made.

ETHNOLOGICAL STUDIES

A study of the life of primitive man on the Pacific Coast, with an elaborate ethnological survey of California has been supported for many years by Mrs. Phoebe Apperson Hearst.

It has resulted in museum collections of great value and the issuance of a dozen bulky volumes.

Tens of thousands of animals and birds have been collected by the California Museum of Vertebrate Zoology, supported by the generosity of Miss Annie M. Alexander, and valuable researches carried on as to how evolution really works.

Study of the processes of life in animal and plant have been carried on for a number of years past through the scientific staff of the Scripps Institution for Biological Research, maintained by Miss Ellen B. Scripps of La Jolla, with aid to the undertaking also from Mr. E. W. Scripps.

And recently munificent provision has been made for attack on man's ancient enemies, the diseases, through the gift by Mrs. Hooper of San Francisco, of property valued at between \$1,000,000 and \$2,000,000 to endow the George Williams Hooper Foundation for Medical Research. Its staff devote their whole time to investigation of the problems of functional and organic and of tropical diseases.

COLLEGE OF AGRICULTURE

Through the long years when Professor Eugene W. Hilgard and then Professor E. J. Wickson directed the work of the College of Agriculture, it achieved a great work of research. It solved multifarious problems of agriculture in a land where Anglo-Saxons have taken up a task wholly new to their race—that of tilling an arid soil, under irrigation; of reclaiming the desert and of raising the fruits and field crops which in the past Northern races of men have bought from tropical countries, instead of raising them for themselves.

Of late the State has richly increased the specific provision for the work of the College of Agriculture and under the direction of Dean Thomas F. Hunt, new great advances are being made. Students may specialize now in any one of seventeen different agricultural pursuits, choosing as a special profession the citrus fruits, say, or pomology, animal hus-

bandry, landscape gardening, economic entomology, veterinary work, dairying—or any one of many other specialties.

The graduate school of Tropical Agriculture and Citrus Experiment Station at Riverside is a division wholly devoted to research and to the training of graduate students in methods of research as to plant breeding, soil treatment, the diseases and pests of plants, or other such problems, with special reference to tropical products.

The University Farm of 781 acres of fine rich land at Davis, in the Sacramento Valley, is used to give practical field work to students in the College of Agriculture and is the site also of the University Farm School, where several hundred young men who have not the preliminary training to enter the four-year course in the College of Agriculture are receiving a three-year training for successful farm life.

SPREADING KNOWLEDGE

To spread abroad into general use the new knowledge constantly being won by science the College of Agriculture pours forth a stream of valuable publications, writes tens of thousands of letters to inquirers, reaches scores of thousands through farmers' institutes, teaches 13,000 by correspondence courses in agriculture, and stations a "farm advisor" in every county which will provide for local and traveling expenses an amount equal to the salary which the university and the United States jointly furnish. The farm advisor becomes a permanent member of his community; through farm bureaus in every neighborhood he stimulates the farmers to use the most improved modern methods, and he serves as a channel through which the local problems can receive aid from specialists at the university.

Just as the agricultural work of the university receives co-operation from the United States, so the general support of the university is derived from many sources. Of the income of the University of California for the year ending June 30, 1914, which was approximately \$2,500,000, there came from the State

of California \$1,574,376.29; from the United States \$80,000; from the income on the endowment, \$279,000. The year's gifts of money for current use or for endowment or for building work were \$192,000.

The balance sheet shows assets of \$15,710,000, of which \$5,540,000 are income producing endowments.

PRIVATE GIFTS

Only private gift has made possible the work of the university. During the past dozen years the gifts have averaged in value nearly \$1,000,000 a year, in lands, buildings, endowments, gifts for current use, additions to the museum, library, or scientific collections, etc.

Mrs. Phoebe Apperson Hearst, for example, gave a museum collection on which she expended over \$1,000,000, but which today could not be equaled for less than \$3,000,000 to \$5,000,000. She built the Hearst Memorial Mining Building at a cost, including equipment, of more than \$700,000. She gave Hearst Hall, the woman's gymnasium; she has supported the Hearst Scholarships for many years and she has made innumerable other gifts of vast aggregate value to library, museum, individual student, or specific department.

Miss Cora Jane Flood endowed the College of Commerce with \$377,000; Mrs. John W. Mackay and Mr. Clarence H. Mackay gave \$100,000 for the John W. Mackay Jr. Chair of Electrical Engineering; Mr. D. O. Mills gave \$150,000 to endow philosophy; Mr. Edward Tompkins gave \$107,000 to endow the Agassiz Chair of Oriental Languages; Mrs. Sather endowed chairs in history and in classical literature with \$140,000 each and a host of others have made gifts great and small.

BUILDING FOR FUTURE

Of particularly fructifying power was Mrs. Hearst's gift to provide for an international architectural competition for permanent plans for the university.

She pointed out that the university site at Berkeley, with its fine background of lofty hills, its noble seaward prospect, and its charm



Oaks on University of C

THE college days of every successful graduate of a university remain always in his memory and throughout his life they exert an influence upon his career. And the memory of those days is always associated with some physical feature of the environment—as, for example, the oaks of the University of California campus. And this suggests a fact that is patent to every thinking person—that environment is one of the prime factors in the development of the human mind. What would Oxford be without its traditions? Yale, Princeton, Harvard, Stanford—the surroundings, the atmosphere—all have their effect upon the student. In California the atmosphere is essentially one of the most invigorating sort—the spirit of the great outdoors hallows the earliest recollections of every Californian. The dotted hillsides, the fields of bending grain, the mountains, the blue



Campus, Berkeley, Cal.

skies—all serve to refresh and render more receptive to knowledge the student mind. Another feature of California educational institutions—particularly the universities—is the amount of room that is given over to their use. At University of California there are great stretches, with winding paths among the distorted oaks leading to retreats hidden in the masses of foliage. Green lawns delight the eye and the structures are attractive in appearance and spacious. On the campus outdoor plays are given when the Greek Theater is not employed for that purpose and the setting is ideal for dramatic offerings. The young men and women who attend a California college will link with the memory of their Alma Mater the recollections of the long summer days and the moonlit nights amid the most charming of natural surroundings, or those enhanced or altered for practical use.

of picturesque and diversified contour, topography, and natural growth represented a unique opportunity for a splendid architectural development. Most universities, like most cities, have "just grown" with lamentable results as regards architecture. She proposed that the distant future should be planned for and an architectural composition wrought out worthy of the State and of the site and of the future of the university.

HEARST PLAN ASSUMES FORM

The Hearst Plan is rapidly assuming visible form. Already completed are the Hearst Memorial Mining Building, the University Library, given by Mr. Charles Franklin Doe, which cost, including the equipment provided by the State, \$883,000; Boalt Hall of Law, for which Mrs. Boalt gave \$100,000 and the lawyers of California \$50,000 more; the Greek Theatre, for which Mr. William Randolph Hearst gave \$50,000; the Sather Gate, which cost \$36,000, and the Sather Campanile, for which Mrs. Sather gave \$225,000; and Agriculture Hall and California Hall, built by the State at a cost of \$213,000 and \$272,000, respectively.

All these are of granite exterior, with steel

frames fireproofed in concrete; concrete floors and roofs of red mission tile. All are of the highest possible type of construction and of fire-resistive quality. And, in their admirable fitness for every day use and in their noble and serene beauty, Mr. John Galen Howard, supervising architect of the Hearst Plan, has made a contribution to American architecture of the highest and most permanent value. The city-planning movement in California, the cause of all that is good in public architecture, is being profoundly aided by this great and successful undertaking in architectural composition on the broad scale.

And, in November, 1914, the people of California set the seal of their approval on the great project of the Hearst Plan by voting \$1,800,000 in the form of the "University Building Bonds," proposed by the alumni through initiative petition, this to be applied to the enlargement and completion of the present monumental library and the erection of three more permanent buildings—a chemistry building, a second unit of the agricultural group and a great class room building large enough to accommodate 3500 students at one moment under one roof.

California and Education

IN CALIFORNIA the little red schoolhouse on the hill is a thing of the past. In its day it may have had its usefulness and certainly the halo of romance cast about it served to overshadow some of the sordid memories our fathers must have retained in which the birch rod was prominent. Today, the most remote rural district of this State has its school, which, while it may not be of brick or stone, is at least comfortable, and equipped with the latest essentials to education. And this includes a pedagogue who knows something besides the "Three R's" and who controls his pupils with something far more effective than the birch rod of hateful memory. Education you must have in order to compete successfully in the world of today. Education you can obtain freely and regularly, no matter whereabouts in California you may elect to dwell.

Leland Stanford Junior University

By O. L. Elliott

Registrar of Stanford University

Editor's Note: As registrar of the Leland Stanford Junior University, Mr. O. L. Elliott is in a position to speak understandingly regarding the great institution of learning with which he is associated. He gives briefly the history of the university from its inception, handling the subject with sympathy and deep appreciation. The development and present extent of the college is told in a manner that renders the article not only valuable but highly interesting as well.

STANFORD UNIVERSITY owes its existence to the public spirited liberality of Governor and Mrs. Stanford, and to the conviction that through the promotion of education their great fortune could be made of most use to humanity. Their only child, the center of their hopes, died in 1884, in his sixteenth year. In creating a university as a memorial to the life thus cut off, it seemed to the bereaved parents that they would be sharing with all the children of California something of what would have been given to their own son had his life been spared.

When it came to the accomplishment of their purpose, two main ideas were kept in mind. First, the outward habitation of the university must be beautiful in design and solid in execution. Again, they would emphasize the practical nature of a university education, which while not neglecting breadth of training, should be so directed as to fit its possessor for some useful calling in life. The founders of the university were not college trained, and their notion of what was necessary to the accomplishment of their purpose

was naturally vague. But in its broad and comprehensive features the actual university has conformed to their general idea; and if in its first quarter century of history Stanford University has made a sensible contribution to the educational progress of the Pacific Coast, it is because of the boldness and the vigor with which the university has stressed definiteness of aim and result as the possibility and the glory of the higher education.

A PEACEFUL VALLEY

The site of the university is the Palo Alto estate of the founders in the Santa Clara Valley—a valley famous for its beauty, fertility, and excellence of climate, where, free from the rigors of Eastern winters and the extremes of Eastern summers, sheltered from the fogs and harsh winds of the coast and from the summer heat of the interior valleys, with a rare ocean quality in the air, the seasons are one succession of springtime and autumn. The buildings have been placed on the broad plain sloping up from the bay to the foothills of the Sierra Morena. Here the old Mission architecture—the long, low buildings

with the wide colonnades and open court—has been reproduced on imposing scale. The main university buildings consist of two quadrangles, one surrounding the other, with a facade 894 feet in length. The soft buff sandstone, the great expanse of red-tiled roof, the wide arcades, the simple but imposing arches, the glimpse of trees and foothills and mountains, give an impression of academic seclusion, serenity and beauty whose fascination deepens as the months slip by under blue skies and flooding sunshine. Other detached buildings for various purposes have been added, and a considerable area, including the first foothills, has been covered with residences of faculty, college fraternities and clubs, and occasional outsiders who have made their homes upon the university campus.

A FORTUNATE SELECTION

The carrying out of their educational plans the Stanfords wisely entrusted to other hands. They were singularly fortunate in their choice of president. However happily the generous vision of the founders has guided the development at Palo Alto, in its characteristic features, in its freedom from hampering tradition, in the autonomy and untrammelled opportunity of the individual department, in its call to the individual student to strike straight for his definite goal, in its exaltation of genuineness and disdain of sham, the university bears the ineradicable stamp of the genius of David Starr Jordan. From his buoyancy, directness, and imperturbable optimism, and the response which this evoked from his first faculty, the university took on a tone and meaning and spirit which not all its staggering vicissitudes have succeeded in effacing, and which have carried the name and fame of Stanford far and wide.

In its internal organization, and in the scope of its instruction, Stanford conforms to conventional types. There are twenty-six departments, each representing a larger or smaller field of knowledge, and covering ancient and modern languages, philosophy, education, mathematics, history, economics and political science, the physical sciences, the biological sciences, and the more formally professional

schools of law, medicine, and engineering. Half the students perhaps enter without any definite professional or vocational goal, and seek among the twenty-six departments for that general education so pedagogically popular and so hard to define. They are guided through the mazes of the curricula by means of the major subject system which allows the student, under the advice of some one department, to group around the courses in that department those supplementary and complementary studies which seem to promise the desired achievement.

But there are two characteristic items which particularly reflect the Stanford contribution to educational progress. First, the university undertook to remove, not set up, artificial barriers between the high school and the university. The educational process it regarded as one, the university taking up the task where the high school leaves it. Stanford does not prescribe particular subjects for admission, but from the outset has held the satisfactory completion of a standard high school course the adequate and sufficient requirement for admission. The other point of departure was the university's recognition of the equality and autonomy of departments. Each department, representing a great field or division of knowledge, was to receive major students with a primary view of inviting them to a (more or less complete) mastery of that field of knowledge. Each department aimed to provide equipment and opportunity for independent work, thus making of the department, for those who had the ability and the calling, the equivalent of a vocational or professional school for those interested in its vocational or professional bearings, and a research laboratory for those devoted to pure scholarship. This challenge to the interest and enthusiasm of the student was not to be obscured by unpalatable curricula, compounds of faculty wisdom and senatorial courtesy, which must first be passed through the system. The student came at once under the direction of the chosen department, and preliminary and supplementary studies were planned with direct reference to the individual student and

the end in view. The opportunity for thus making the educational process more interesting and more effective, while realized in fact in varying degrees only, has nevertheless stamped the whole spirit of the university.

STORMS WEATHERED

The university was opened in October, 1891, and 550 students were registered the first year. In 1893, following the death of Mr. Stanford and the financial panic of that year, the university's resources were completely tied up and for a time its continued existence seriously threatened. Largely through the unflinching courage and devotion of Mrs. Stanford the storm was weathered, and in 1898 another forward movement began. This was again interrupted by the earthquake of 1906 with its enormous damage to the university buildings. Growth in numbers has therefore not been rapid in comparison with that of other universities. The attendance figure has this year (1914-15) for the first time reached and passed the 2,000 mark. The university en-

dowment is not far from twenty-five millions. Not all of this is interest bearing, and without tuition fees (except in law and medicine) the income is not large as modern university incomes go. The present number of students about reaches the limit which the trustees are willing to consider that they have means to provide for. The immediate problem is how to restrict the very natural tendency of a live university to grow. Whatever readjustments the future may require if only the present momentum be maintained Stanford University must continue to be, as it has been in the past, an important factor in the educational development of California and the Pacific Coast.

After twenty-two years of service President Jordan resigned in 1913, and the trustees created for him the new office of chancellor. His successor in the presidency was Dr. John Casper Branner, professor of geology from the beginning of the university. President Branner in turn will retire at the end of the present academic year. Stanford's third president, yet to be chosen, will take office August 1, 1915.

IN ALL schools, children should be taught to work in wood and iron, to understand the construction and use of machinery, to become acquainted with the great forces that man is using to do his work. In this way boys would learn their aptitudes—would ascertain what they are fitted for—what they could do. It would not be a guess, or an experiment, but a demonstration. Education should increase a boy's chance for getting a living. The real good of it is to get food and roof and raiment, opportunity to develop the mind and body, and live a full and ample life. The more real education, the less crime—and the more homes the fewer prisons.—*Robert G. Ingersoll.*

The High Quality of California

By E. J. Wickson

(Editorial)

THE quality of rural life in California is relatively very high for several reasons which can be clearly indicated, and it has manifested itself by achievements which could not otherwise have been attained, and by the creation of rural conditions which promise even greater achievements not alone for industry but for manhood and citizenship.

The foundation of the quality of California rural life was laid in the very settlement of the State by those who had the nerve and ability to push through on the overland trails while those less resolute and less capable were either appalled by the effort or could not persist in it. In early days accession to California was largely a matter of courage and endurance. Afterwards, and even to the present time, another criterion of selection has prevailed, viz: mastery of funds and business confidence and enterprise. California development upon a high plane of intelligence and financial ability has been ministered to by people from every civilized state and nation, and has escaped a low average in such intelligence and ability because its remoteness and cost of attainment have largely protected it from mass movement of inferior people from any state or nation. By what she has gained and by what she has escaped California has a select population in certain qualities which make for success.

Such people, of course, might have been expected to operate and to succeed in a large way in whatever intellectual and industrial effort they entered upon. When the chief pursuit was gold the per capita production was the greatest attained in the world at that date; the same was true of wheat in the 60's; of wool in the 70's; of fruit in the 80's, and to the present; of higher education in the 90's

and to the present also—for two universities of the first rank are not in the possession of any state which is not vastly greater than California in population. The California people because of their per capita content of power, gained by the process of selection and increased by the exercise of power, according to recognized laws of development, have achieved great things in various lines. In the undertakings of rural life, which now constitute the over-shadowing industry of the State, California has employed energy, capital, and applied science to novel products under novel, natural, and economic conditions in ways and to results which would have been altogether unapproachable to a less resourceful people.

Having said this much to indicate the origin and quality of a people which has but just begun the development of this great State, I desire to mention a few specific things which I believe underlie the advanced and most satisfactory type of country life which is characteristic of California.

First: Broad views of education. Although it is true that a considerable part of the present expansion and profitability of our leading lines of agriculture is due to those who came to California in mature life and brought capital and minds well trained in business and professions, one would not prescribe their rich acquisitions and experience, in curricula for others to pursue. Still it is a fact that their example, and their precepts also, are a strong force for breadth in our educational efforts for agriculture. The success of the broad man in California is an incentive to breadth in our training. California is keenly conscious that common schools which do not employ rural phenomena and points of view in their daily work are culpably narrow and neglectful. The

California Rural Life

difficulty which these mature men have had in ascertaining elementary facts about natural conditions of growth in California makes them strongly insistent that these, and cultural methods to meet these, shall be taught in the common schools, and that high schools and colleges shall deal with them also in their higher bearings, with due regard to exposition of the best local practice in this State. It is perfectly clear that our people hold education in agriculture from youth to manhood to be a fundamental need and teachers of all grades are alert to qualify themselves for the work.

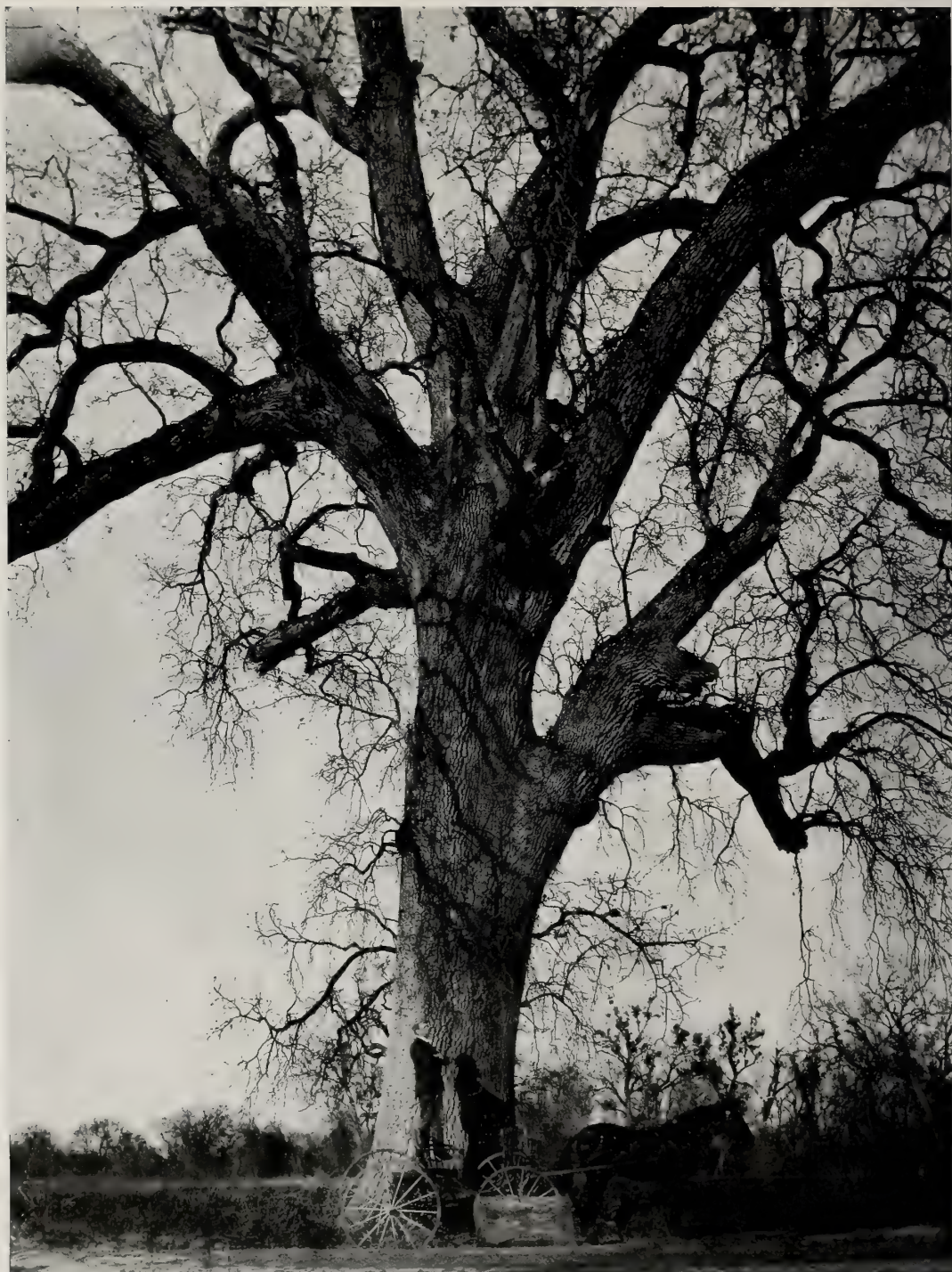
Second: Social and financial recognition of agriculture. The recognition of agriculture as pursuit which does not debar its votaries from the highest social standing need not be contended for in California; it is freely conceded, not only in theory but in regular practice, and agriculture as a vocation for young men is discounted only by a few farmers who do not understand or appreciate their own calling or are pursuing it under too heavy a handicap of some kind. There is in fact some danger that recourse to agriculture is becoming too popular, even fashionable, with our urban population because they are disposed to exaggerate the profits and minimize the knowledge, ceaseless effort and command of adequate capital upon which success depends. This danger is, however, in itself an indication of the attitude of the California mind toward agriculture. Individual social recognition of a farmer is governed by exactly the same criteria, wise and otherwise, which fix the place of a man following any other work in life.

Financial recognition of agricultural security has notably advanced during the last thirty years. It began in the acceptance of warehouse receipts for grain stored in country warehouses at that early date and since then loans on other gathered products or on growing crops have been freely available under or-

dinary financial conditions. The old disfavor of country real estate as compared with city property has largely passed away; in fact, much money has been loaned on boom valuations or prospects—an indication of the general confidence in agricultural security carried to excess, but still, in a way, evidence of the popularity of agricultural enterprises among our local financiers. Rates of interest are, however, too high considering the security of legitimate country loans and any scheme which would help other parts of the country in this regard would be of great advantage in California.

Third: Average excellence of California country homes. With the understanding that light construction is advisable under climatic conditions ruling in California, it must be claimed that California country homes are of very high average excellence. This might be expected from the intelligence and social standing of the people who construct them. It is probably true that there is a greater per capita consumption of periodical literature in California country homes than in other rural communities. The per capita supply of running water, hot and cold, in farm houses and the use of it in all the devices of modern plumbing for cleanliness and sanitation are also very large.

Fourth: The benign influence of co-operation. Unquestionably the most powerful agency for advancement in the quality of rural life in California during the last two decades has been co-operation. Underlying co-operation is, of course, the general intelligence and business capacity of those who undertake to co-operate. Thus a degree of education must precede successful co-operation, but co-operation is itself the most potent educational agency which has ever been invoked in California. It not only enables men to achieve, but it points the way continually to greater achievement. Strong co-operative effort is se-



LOOMING high above its neighbors, this gigantic California tree has developed to an enormous height, as can be noted by comparison with the man standing in his buggy. This tree is one of the innumerable landmarks of interest with which the State abounds.

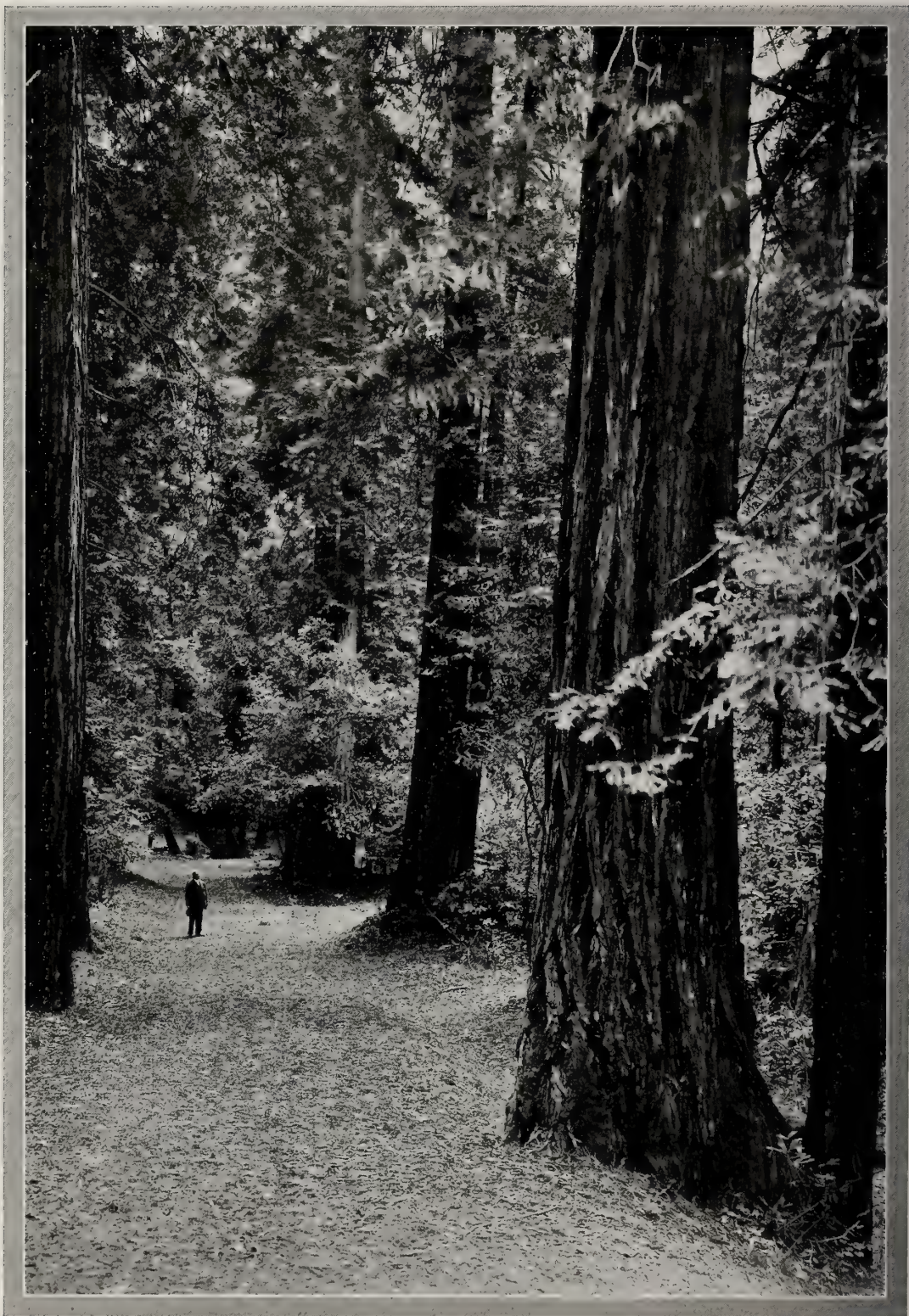
curing protection for our fruit industry all the way down to the killing of injurious insects from the United States supreme court. It has made feasible the distant distribution of 123,000 carloads of fruit products annually; it has secured nearly all our recent large provisions for agricultural education and research; it has secured fair treatment from allied interests which formerly dominated rather selfishly; it has enabled producers to demonstrate possession, not only of force, but of business acumen, soundness and capacity, which have not always characterized co-operative undertakings, and have commanded the confidence and respect not only of rival business interests but of financial institutions.

It is clear, I think, that the high quality of California rural life is demonstrated by its chief product, intelligent and successful co-operation. It is no less clear that what California may still need for the better life and more effective work of its rural population, it may secure through continued recourse to co-operation, the agency which it has itself engendered.

In a word, the lesson of California experience in attaining a high grade quality in country life is this: Strive for the dissemination of a degree of intelligence which makes effective and durable co-operation possible, then let such co-operation do its perfect work.

California Holds High, Low, and Game

CALIFORNIA, with an area of 158,000 square miles, is the second largest State in the Union. It exhibits wide geographic diversity, for it includes the lowest area in the United States—Death Valley, 276 feet below sea level, and the highest, Mount Whitney, 14,501 feet above the sea. Similarly there is a great diversity in scenic effects, climate, and vegetation. Records obtained at meteorologic stations in the Salton Sink indicate a maximum temperature of 130 degrees in the shade, the highest recorded within the continental United States, while it is probable that minimum temperatures on the higher peaks, like Mount Whitney and Mount Shasta, approach the minimum within our boundaries, a total difference of nearly 200 degrees. Records of rainfall in the most arid sections of the southern deserts of the State represent the extreme of aridity in the United States, showing an annual average of less than three inches and periods of twelve months or more with only traces of rain, whereas the precipitation in Northwestern California is very heavy, an annual average of close to 100 inches being recorded at a few stations in Mendocino and Del Norte counties.—*Water Supply Paper 338, U. S. Geological Survey.*



A Scene in Muir Woods, Three Hours from San Francisco



California: Playground *of* the World

By Menard Gilbert

Editor's Note: Seen through the eyes of a nature-lover and an ardent Californian, this State offers untold wonders. Mr. Gilbert is both of these things; he is, moreover, thoroughly equipped with practical knowledge of what California can afford those who for one reason or another seek her for recreation or rest. The West is an open book to Mr. Gilbert, who has traveled throughout the length and breadth of the country many times. His article makes picturesque reading and, while the author is an idealist in many ways, he is not such to the exclusion of practical methods. He has identified himself with the California Publishers' Co-operative Association and will take an active part in the extensive work for California the organization contemplates. As a native son, Mr. Gilbert also believes this work will, patriotically, prove wholly agreeable.

CALIFORNIANS are firm believers in the adage, "all work and no play makes of Jack a dull boy," and since they have been favored by Nature with an environment that conduces to recreation in the fullest sense of the word, they not only mingle play with their work but soon teach all newcomers to do the

same. Thus California is fully entitled to the appellation—"Playground of the World"—bestowed by those who, regarding the State from the viewpoint of the outsider, have been able to grasp the significance of its possibilities more thoroughly, perhaps, than have those who see its wonders all about them, every day



It matters not whether the balmy airs of summer or the snows of winter dominate the scene, the playgrounds of California are equally attractive to those who delight in Nature's every mood.



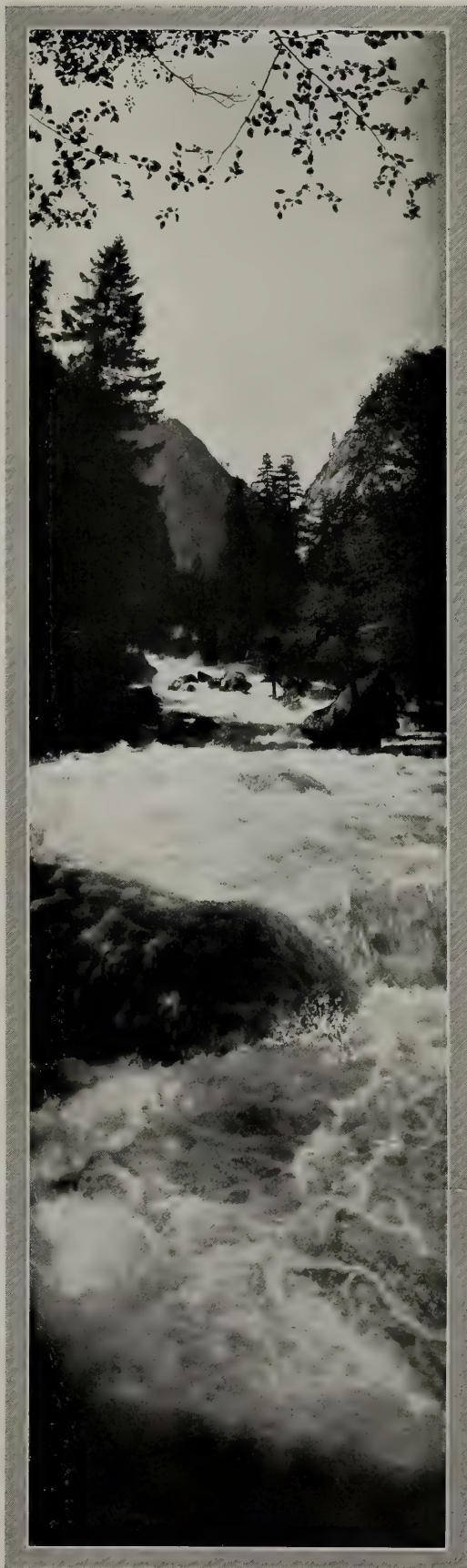
of their lives. Not that familiarity could ever breed contempt and the Californian is justly proud of his domain, but the novelty having been blunted to some extent, he occasionally fails to realize that he is living in a wonderland and that a day's journey will, generally speaking, bring him to scenes that are unexcelled for grandeur or idyllic charm anywhere else in the world. So that there are Californians who have dwelt for many years almost in the shadow of the Yosemite's towering crags, yet who have never visited the famed valley.

It is not too much to assume that every normal man and woman is a lover of Nature. No matter what their creed, occupation, or station in life, the sublimity of natural scenery, the majesty of lofty peaks, the hush of the forest aisles, the restless song of the sea, the simple peace of a purling brook with fern-embowered banks—these things will appeal to those who look "through Nature up to Nature's God."

The child in man never entirely deserts him so long as he breathes the breath of life. Because we have put aside forever toys and pinafores, is no reason to imagine that we have finally locked our hearts against those things that appeal to our sense of the beautiful, or that keep the fires of youth burning long after our hair has been silvered by successive winters.

If, then, to mix a little play with one's work is essential to the health, happiness, and success of mankind, the next thing to consider is where that play may most profitably be indulged in. The Westerner need go but a short distance to find his playground and it will profit even the most remote Easterner, Northerner, or Southerner, as the case may be, to follow the sage advice of that philosopher who said: "Go West, young man, go West." Young or old, man or woman, if one would commune with Nature in her grandest moods, pursue the trout in his native waters, lave in the rolling breakers, bask in the soft airs of a semi-tropical paradise, or dare the rugged steeps of mountain fastnesses—California is the place, and it shall be my purpose herein-

Where the Merced River, whipped into foam, tumbles over a rocky bed in the Yosemite Valley



after to tell briefly of some of the natural playgrounds with which the State abounds, open to the children of all the world up to the age of ninety-nine years.

THE MOUNTAINS

Says Edwin Markham in his latest volume, "California the Wonderful":

"Again and again in California great Nature, the mystic world-mother, has sounded the note sublime. Seashore, desert, mountain, giant tree, strange valley, towering cliff—all have been staged for a world spectacle, a drama of magnificence.

"From every point in the State you may look upon majestic mountains, some of them lifting their broad fronts near at hand, and others making ghost-flights in the distance."

The Californian Sierra Nevadas cover 600 miles, reaching from Mount San Jacinto to Mount Shasta, and nowhere in all the land is there a more wonderful vista of mountain scenery. At times the cloud-searching summits tower to a height of 15,000 feet, with great canyons between and clothed withal by mighty sequoia, pine, and fir forests, owning moreover, a valley which was termed by the Indians "the Heart of the Sky Mountains," and which constitutes the greatest of the Sierran rifts, a place of everlasting wonder, a battleground of giants, the evidences of whose titanic struggles the soft mosses and feathery trees seek vainly to hide, while Titan's tears gush forth forever in cascades of colossal fall and shimmering beauty.

On the Western Slope there are innumerable trails whereby the Sierras may be entered but only through certain gateways may we pierce the fastnesses, penetrating to the East. Here the alpine climber may find conquests worthy of his steel, for these trails are at times obscure, even perilous. The gateways to the Mohave are the San Gorgonio and the Cajon passes, while to the north are the passes of Tehachapi and El Tejon, and still further in the same direction is Kearsarge Pass, highest of the mountain gateways, the entrance being near the head-waters of the south fork of King's River. Mono Pass is 100 miles beyond and east of the Yosemite, and continu-



In winter the boughs bend beneath their white burden (a scene in the Yosemite)

ing on at last is reached Beckwourth's Pass, named for a valiant Virginian, pilot of those who in early years essayed this trail, and who had discovered the rift in the mountains many moons before.

There is adventure and to spare for those who would spend their play time in the lap of Nature in her most rugged form. There is romance and tradition to please the heart of the most ardent; through these clefts, the miners' pack trains in the "days of gold" wended their arduous way; in the shadows of the soaring peaks, hidden by tangled brush and giant trees, the picaroons of the early West, bandits whose names have come down in history, plied their desperate trade. There, today, the coyote and the grizzly bear, the puma and the vicious tree cat, still haunt the silences; there is hunting and fishing and mountain climbing and regions of eternal snow, with views that turn the head dizzy by their elemental vastness. This, indeed, is a playground for the stout of heart, but there are places to which even the most timid may penetrate without fear, and yet gain a splendid conception of the ultimate wonder of the region.

THE FOREST WONDER

Up to that point where the snow queen bars further advance into her white domain, the forests curve over the ridges and canyons down the whole vast extent of the Sierras. From the madrone and oak-clothed foothills one climbs upward to where the pine, the cedar, and the fir stretch onward to the frozen belt.

Both north and south of the Yosemite for a certain distance are the mighty sequoias, monarchs of treeland, while the Coast Range, bordering the shores of the Pacific, boast wondrous redwood forests, which, beginning in the latitude of Santa Cruz, reach beyond the confines of the State in a 400-mile stretch. In this Coast Range are such familiar peaks as Mount Diablo, or Tamalpais, while journeying northward, one encounters the starry heights that rise above the land of Mendocino, where the heart of the redwood forest is. Here is a region of silence broken oftentimes



Vernal Falls, Yosemite—one of the most beautiful cascades



Where Nature's graceful carvings along the Monterey Coast

solely by the booming of the mottled grouse, while in the crags the eagle finds his home, in a freedom as perfect as that of the land whose symbol he has become.

Here is every joy that can be expressed by Nature, traced in fern-haunted hollows, fields that are carpets of wild-flowers, vistas that invite excursions and point the way to fairy-land.

Leaving the Coast Range and returning to the Sierras, a slightly more extended consideration is deserving Mount Shasta—always beautiful, always a glorious picture by day or by night, in any weather from any point of view. Alone, dominant, masterful—a solitary monarch brooding over an incomparable empire, head encrowned in ermine, appareled in Lincoln green, at its base gardens where summer roses blow and azaleas mingle with lilies and all is a riot of color and perfume—such is Shasta.

Taking the back trail, Mount Lassen is encountered, a living volcano, scarcely a desirable playmate, but, like an ill-tempered

child, venting its fury and harming no one so much as itself.

A SPORTSMAN'S PARADISE

The huntsman and the disciple of old Izaak Walton are the greatest children of all. The pursuit of edible game or of that which is dangerous or destructive, is apparently innate with man—sometimes he carries it to extremes and allows his love of sport to take the place of better judgment. But in the Feather River country, of which Oroville marks the portal, there is game and to spare, fishing to make the angler's blood leap; shooting involving all the excitement essential to the sport, unless one's ambitions turn to the African big game trails.

What is termed the Feather River country includes half a dozen counties, but perhaps the most prolific game sections are to be found in Plumas and Butte counties. This wonderful expanse of primitive California has been opened up to the public but recently by the Western Pacific, which runs through the Grand Canyon of the Feather River from Oroville to Mabie, a distance of 113 miles.



paralleled by the hand of man—Serpentine 17 mile Drive

Matchless in color, walled by mountains, a mile and more above the sea, lies Tahoe, an enchanted lake whose hues rival the boasted Bay of Naples or the waters of Como, and environed as some fabled inland sea in the Arabian tales of Scheherezade. Here there are boating and fishing and opportunities for camping amid scenery that is exquisitely beautiful. It is a region of lakes about which innumerable resorts have sprung up, all accessible by railroad and stage routes; there is tennis and dancing for those who prefer less rugged amusement; for the more adventurous, riding and mountain climbing. Among the numerous pools of varying sizes and character, is Donner Lake, three miles from Truckee, famous because it was the scene of the Donner tragedy in 1846. Standing sentinel over this land of lakes is Mount Tallac, with lesser peaks all about, girding this scene of Sierran sorcery.

NATIONAL PARKS

Elsewhere in this volume I believe the national parks of California have been described in detail, and therefore I need refer

but briefly to these natural playgrounds for the people, now cared for by the national government. Yosemite has already been touched upon, and were a dozen pages to be devoted to it, justice could not be done to what is unquestionably one of the most sublimely beautiful spots in all the world.

Here the woes of a world may be forgotten in silent and awed contemplation of Nature's handiwork. Here there are lakes so still that a reflection perfect as in a mirror is found; cascades that tumble down precipitous cliffs from inspiring elevations, churned into foaming fury upon the rocks below; waterfalls that pour smoothly over glassy rock faces, or fall filmily, like the veil of a bride. Here the waters sing a song that after a time becomes a part of one's very life, a soothing murmur, plaintive at a distance, like a mother's lullaby. Here is everything that Nature can give of beauty and wonder and enchanted loveliness.

By day, especially at dawn, when rose-hues vie with gold as the sun appears, the Yosemite Valley is unspeakably beautiful; but



Over satin faced rock barriers pour the waters in feathery foam

it is perhaps at night, when "her lofty cliffs and pinnacles are stilled and silvered by the moon" that one gains the most inspiring picture. At sunset, a fire kindles in the hollows and clefts, and turns the tree tops into living flame, while all the vast floor of the valley is a sheet of gold. If ever the great god Pan lived and ruled, this had been his kingdom. Every tree might mask a hamadryad, every bush a satyr, and in the falling waters one need not stretch the imagination greatly to behold nymphs playing and leaping in the rainbow spume, mingling their laughter with the ceaseless song of the cascades.

In the General Grant and Sequoia National parks are great groves of sequoias, sheltered by the law, protected from destruction, to remain as they have for countless ages, compelling in their magnitude, gigantic, Gargantuan toys for the children of men in the kindergarten of God.

In these places are fishing of the finest,

automobile roads, and ideal camping provisions, but it is the great sequoias that will ever prove the prime attraction to sightseers in these protected parks.

THE BIG TREES

There are, properly speaking, two varieties of the sequoia—the *Sequoia sempervirens* and *Sequoia gigantea*. The former is the redwood, composing the immense Coast Range groves; the latter is the real big tree of the Sierras. The redwood attains a height of 275 feet, while the big tree soars at times 400 feet toward the sky. In girth, the big trees sometimes measure ninety feet around. As to age, there is scarcely a possibility of actual estimate, but they are certainly the oldest living things in all the world.

Aside from the trees found in the national parks, may be noted those in Big Basin, or California State Redwood Park, sixteen miles from Santa Cruz; Santa Cruz grove, six miles from Santa Cruz; Muir Woods, the nearest

to San Francisco; Giant forest; California grove; a grove in Calaveras County; Mariposa grove, near Yosemite Park, etc.

Seated some night in midsummer by the wonderful stretch of white sand and the broad expanse of sea and sky, at one of the Los Angeles beaches, watch the phosphorescent glow that tints the crests of the high breakers, until they seem the home of moonbeams; hear the boom of the surf, as the walls of water break and tumble shoreward—and no matter how unromantic you may think yourself, you will be moved. See these same breakers in the light of noonday and they lose some of their awesomeness but none of their charm, a charm that is as potent as that supposed to have been exerted by the sirens to lure sailors upon the jagged rocks of the coast of Sicily. There through the long summer days children, old and young, disport in the surf, like dolphins, laughing, sun-browned, glowing with health; resting betimes in the silver sand,

breathing in the good salt air, absorbing the health-giving sunlight.

Such are the southern beaches, such, indeed the beaches of Monterey Bay, Santa Cruz, Pismo, Santa Barbara. The beach at the Cliff House, San Francisco, while not always warm enough to make swimming enjoyable, is much of the time a delightful resort, with picturesque attributes, such as the Cliff House, Sutro Park, etc.

Pebble beaches like that at Catalina Island offer a variation; while for those who prefer fresh water swimming, the beautiful country along the Russian River affords many opportunities for delightful vacations.

At nearly every beach there are added attractions, such as concerts, golf, dancing, and so on, so that the "children" may not find time hanging heavily upon their hands when the call of the waters sounds but faintly in their ears.

There are springs without number sprinkled



Giant tree in Wawona Grove, Yosemite—a patriarch of Gargantuan proportions—compare the size of the man with that of the tree

throughout many parts of the State. Along the line of the Northwestern Pacific are innumerable resorts adjacent to all sorts of medicinal springs, while this same line taps some of the most picturesque scenic country in the State.

But a few of the attractions of California for those who are on pleasure bent have been noted in this necessarily sketchy paper. Perhaps some of the most charming and idyllic spots are to be found unexpectedly by the va-

cationist with an eye for beauty. At the end of every by-path new wonders await those who go straying away from the haunts of men. Arcady lies just over yonder and by that Castalian font Pan pipes as of old, calling his subjects to play. Care can not follow into those wildwoods; once buried in the immensity of Nature's breast, men and women, children all, find surcease from every sorrow, "the world forgetting and by the world forgot."



THE joys of motoring and other methods of travel are enhanced a thousandfold by fine roads, and these are a feature of California. The road builders of this State have also learned the value of retaining natural scenic attractions, as the above photograph evidences. Incidentally, if you are living in some other State and wish to know about the touring possibilities of California, send a query to the Service Department of this publication and information will be supplied cheerfully.

California's Financial Resources

By Hon. Alden Anderson

Formerly Lieutenant Governor of California, Bank Commissioner, Etc.

Editor's Note: Honorable Alden Anderson is a man whom Californians have delighted to honor and he has always returned public service commensurate therewith. He has been connected from his youth with our great fruit producing and shipping industry and by his mastery of large undertakings in that line was drawn into leadership in financial affairs and to special interest in banking and its relation to California industries and development. As the future of our State must rest fundamentally upon fair and righteous banking, Mr. Anderson's experience, insight, and knowledge of the relation of important things eminently qualify him to set forth our California financial resources, which he does in a popular way for general edification.

THE banks of a community bear the same relation to its commercial life as the heart does to the human system. Money is the industrial life blood, and going through the arteries of trade is essential, in this day of intricate and extensive exchange of commodities, to the continued existence of our present-day standard of living.

As banks are the financial warehouses, I will, for the purpose of this article, consider the assets of the banks as the financial barometer. It is not my intention to relate past history of banking in California, but rather to give an idea of financial conditions of San Francisco and the State of California at the present time and relate in as few words as possible the reason or causes of the strength of that position. There is, quite generally, much confusion in the minds of those who do not give

the matter deep thought or study, as to the function of banks and the source from whence the bulk of the assets of the banks come. Banks do not coin money or create wealth. Rather do they reflect the status, the condition and the resources of the place or district wherein they are located. They are the conservators or concentrators of the values made by others, and if a community had no value there would be no banks, or need of them, to handle its finances.

The total assets of the State banks of California, according to the report of the Superintendent of Banks of the State, under the call of September 24th, 1914, was \$742,182,780.47, and the total assets of the national banks, under the call of the Comptroller of Currency (or the average of calls of 1914) was \$512,252,197.35, or a total of \$1,254,434,977.82. Of these

total assets, San Francisco banks hold \$538,711,177.70.

RIVAL VALLEY OF THE NILE

With the above as a criterion, it needs no argument to prove our importance as a financial center. Broad valleys, with soil as prolific as the famed Valley of the Nile, but with a far greater variety of production; the hills beyond, with their thousands of acres of pasture, and the mountains with their forests of timber and deposits of mineral wealth; with water transportation to the ends of the earth, and the main lines of railroads leading north and south, east and west—there is no single necessary element lacking to prevent a continual increase of wealth, of development and social and material progress.

The development of this rich country has not much more than obtained a good headway as yet, but the signs of the times indicate a rapid increase and every step forward will add to potency and power as a financial center.

To prove that the figures given are not misleading, and that the totals are based upon substantial actualities, it is but necessary to enumerate the value in dollars and cents of various productions of the State for last season. Some of the figures are for the actual results and the others estimated by competent authorities engaged in the different industries:

Orchard products	\$112,150,000.00
Live stock and dairy and poultry products	87,500,000.00
Field and garden products.....	133,000,000.00
Vineyard products	32,000,000.00
Mineral products	130,000,000.00
	<hr/>
	\$494,650,000.00

Four hundred and ninety-four million six hundred and fifty thousand dollars for our year's crop and output.

There is the story. With that prodigious production and many of the activities only in their infancy, the strength of our position and continued growth and development is not problematical.

Our distance from other financial centers, in a way, has developed independence and self-reliance and it is satisfactory and pleasant to those interested in the banking business to have the scene of their endeavors far removed from the agitated centers, and to feel that no matter what the stress and strife and contention brings forth in the way of new necessities, of new alignments and adjustments, that they will probably be less affected than those engaged in the same business in any other part of the country.

I do not mean to infer that a general industrial and commercial depression would not affect us, for it would, but I do mean that we are probably as little affected, one way or the other, as any other section in the United States.

Being in the midst of a great producing section, as the above figures denote, where the variety and extent of production are approached nowhere else in the world, a regular income is sure and in wet or dry years, high tariff or low tariff, we finish our twelve months' work in a stronger position than we commenced it.

SAN FRANCISCO FAVORED

San Francisco is recognized as the most important financial center of the Pacific Coast. When the selection of cities for the location of the twelve Regional Banks was under way there were many requests for preferment, but when it was found that there would be but one of such banks on the coast, by general consent the location was awarded to San Francisco.

The Federal Reserve Bank of San Francisco ranks sixth in total assets of member banks and the district, Number 12, is comprised of Idaho, Washington, Oregon, Nevada, Utah, California and practically all of Arizona, a territory larger in extent than Great Britain, Germany, France and Italy combined (exclusive of colonies). With reference to

deposits, the member banks of California have 53 per cent of the total deposits of the member banks in the territory comprising the district, and as above indicated, the State banks are in the same relative strong position.

To be a successful banker in California requires a vast amount of general knowledge and information and makes the study of human nature constant and imperative. The bankers here deal directly with as cosmopolitan an aggregation of patrons, or would-be patrons, as could be gathered together at any place, were a universal call heeded for a congress of the nations and the peoples of the earth.

A list of the daily callers and their business with the officers of any commercial bank in any of our large cities would make very interesting reading and would at the same time give a good idea of the variety of things a good bank official must be more or less conversant with.

SOME BANK CALLERS

Here comes a native of Sweden, who desires to talk about the raising of sugar beets; next a native of Switzerland, barely able to make himself understood in English, wishes to add a few cows to his string. The following visitor, a genuine Yankee, who has become a hop grower, and wants more land and a new kiln; now a fisherman must have a new boat and new nets, and then a trio of Japanese, to report the operation of their rice mill already erected and to negotiate an additional loan on warehouse receipts for rice stored. Here appears a soft-spoken Chinese who has in prospect the leasing of a large cherry, pear, peach or plum orchard, and must first arrange for additional finances. Next a retired merchant from a large middle west city, who has followed the setting sun and intends to spend his remaining days in California, has purchased an orange and olive grove and wants information as to whom he

can best employ to do his orchard work for him. Next comes an enthusiastic Italian to report on his sales of shipping grapes and maybe to negotiate a loan on wine stored. Here a Canadian who is going to plant an orchard of walnuts (a large growing tree) and alternate with almonds (a small growing tree), and what does the cashier think of it, and will his bank assist him in his enterprise. One day I heard a babel of strange voices and considerable confusion in the lobby of our bank. Upon investigating I found about fifteen Hindoos assembled there and evidently holding an animated meeting. It seems one of their race had been arrested and they were considering ways and means of bailing him out. So it goes; here a Syrian buys exchange to send to his beloved and far away Jaffa; a Portuguese tells of his success as a cheese maker and of cutting six crops of alfalfa this year. He adds to his growing savings account against a day when he can send for his brother Manuel, or buy more land. A chicken raiser pays off an old loan and wants to know what the prospects of a new loan are if he decides to plant twenty acres of broom-corn so that he may have the seed for his chickens and the stalks for the broom factory. Nationality follows nationality; merchant follows farmer and farmer follows merchant, so that we bankers are receiving constantly mental photographs of the activities and marvelous diversity of, as I said before, the most wonderful productive and cosmopolitan section in the world.

CALIFORNIA'S EXCELLENT BANKING LAWS

In conclusion I might say that we have in California as strict, complete, far-reaching and altogether good bank laws as any state in the Union, and that the State banks generally strive to uphold the spirit and the letter of them. If banks here follow the law there is no danger of them getting into financial difficulties.

The national banks of the section stand

now as they always have, very high, and those interested in them feel quite well satisfied with the new Currency Act, just passed by Congress, and believe that it will assist them very materially in hand-

ling the business of their patrons, inasmuch as California is such a large shipping and exporting state and the provisions of the new act are particularly advantageous to such activities.

The Heart of Commercial Life

BANKS are the heart of the commercial life of any community. Where there are banks there must be money, or there would be no need for them. There is an old saying, "If you would make money, go where money is made"; in other words, seek those localities where the financial conditions are evidenced by the provision for their development. There is scarcely a country town of any importance whatever in California that has not its banking institution, and the man at the head of that institution is generally respected and looked up to as a fount of wisdom. This is as it should be: A bank should not be merely a place where money is kept and dispensed; it should be (in the smaller community) a headquarters of financial information; a bureau of advice to farmer or stockman, fruit grower, or vineyardist, or manufacturer. Hard and fast rules are said to be necessary in business, but the biggest business men will tell you that there are no hard and fast rules in business. And the bank with men at its head who mix a little humanity with their business methods will lose nothing and gain much. But, by the same token, bankers must be readers of character. California bankers know the conditions of the localities in which they are situated. They know the people and many the overdue note that is held up a few days longer to help some fellow out of a hole; the mortgage on the farm is pretty much of a joke nowadays, especially in the West, but the foreclosure is relegated to the limbo of things forgotten. The banker must be the friend of his patrons, and they must know it so that all parties concerned may carry on a profitable business relationship.

"The development of this rich country has not much more than obtained a good headway as yet, but the signs of the times indicate a rapid increase. . . ."

*—Hon. Alden Anderson,
formerly Lieutenant-Governor of California.*

AND SO, you see, opportunities for success in California are abundant. This must be so in a country whose development has scarcely begun. Mr. Anderson (in the preceding article) continues by quoting figures on production, and adds: "With that prodigious production and many of the activities only in their infancy, the strength of our position and continued growth and development is not problematical."

IS NOT that convincing evidence that California is the place for you, no matter what your present prospects? Doesn't it prove to your satisfaction that the man who can do so and does not come to California now is missing a golden opportunity to lay the foundation of his fortunes—more, to establish in himself and in the hearts of those dependent upon him a true sense of the joy of living?

LET US tell you, through our READERS' SERVICE, more of this wonderful State. You have an example of what we can supply in this respect in this number of CALIFORNIA'S MAGAZINE. But we have resources of information far beyond what are manifested in this volume. Ours is the most far-reaching co-operative organization for the development of California that has ever been formed. We know what California can do for the world and we mean that the world shall know it, too. We can bring overwhelming proof to support every assertion we make and to convince even the most skeptical of the true greatness of CALIFORNIA. Write us today.

READERS' SERVICE

CALIFORNIA'S MAGAZINE

NEW CALL BUILDING, SAN FRANCISCO, CAL.



Courtesy Santa Fe Railway Co.

Vernal Fall, Yosemite Valley. Located at the head of the Valley, this wonderful cascade is one of the largest of all the Yosemite group. "Vernal meets all the requirements of an ideal cataract,—a solid sheet of clear water bending easily from the brink of a broad, level platform, and offering all the colors of its own delightful rainbows."—John H. Williams.



Kearsarge Pinnacles and chain of lakes near Kings River Canyon

The National Parks of California

By Mark Daniels

General Superintendent and Landscape Engineer of National Parks under the United States Department of the Interior

Editor's Note: Mr. Daniels was appointed superintendent of national parks because of his established reputation as a landscape architect. He has designed some of the most satisfactory work in that line ever achieved in this State. His command of the resources of his profession and his thorough understanding of the artistic and humanistic elements involved in the management of great natural endowments for the greatest public good are demonstrated by his discussion of the principles underlying the proper management of the national parks of this State. Californians have a profound interest in the subject, and Mr. Daniels ministers to the promotion and satisfaction of it.

CALIFORNIA enjoys the unique distinction of having within her borders three national parks and six national monuments. Of these the three parks are: Yosemite National Park, Sequoia National Park, and General Grant National Park. The six monu-

ments are: Muir Woods, the Pinnacles, Cinder Cone, Lassen Peak, Devil Postpile and Cabrillo. The three national parks and the first two named monuments are administered by the Interior Department, the next three named national monuments are admin-



istered by the Department of Agriculture, and the last is administered by the War Department.

There are two general classifications of the land set aside for the preservation of scenic wonders, historic landmarks and objects of historic and scientific interest, the national parks and the national monuments. The principal difference between the two withdrawals is that the national parks are created by act of Congress and generally carry an appropriation more or less adequate for their protection and administration, while the national monuments are as a rule set aside by presidential proclamation, with no funds appropriated for their maintenance.

Some considerable objection has been made to California possessing so many parks and monuments, but if one is conversant with the topographical and geographical conditions of the State of California the objection quickly changes to a feeling that the number and areas of these parks and monuments within the State is very inadequate.

EXQUISITE MOUNTAIN SCENERY

The Sierra Nevada Range of mountains from Mount Whitney to Mount Shasta is replete with scenery such as people of all countries travel thousands of miles to visit. There are in this range of mountains the deepest canyons in the world, the largest trees in the world, the oldest living thing in the world, the highest waterfalls in the world, and the highest point of land in the United States, and in addition to all of these marvels and wonders the entire range is a riot of exquisite landscape beauty, wild flowers, forest glades and alpine lakes.

To one who has traveled these mountains the fact that so many people from this country travel annually to Europe is a never-ending source of wonder. Men who have made mountain climbing their pastime and occupation for years have said that undoubtedly the finest range of mountains in the world for tourists and mountain scenery lovers is the Sierra Nevada, and it is particularly surprising to hear such men as Professor J. N. Le Conte of the University of California state that in Switzer-

Bridal Veil Falls in Yosemite Valley—one of the most renowned of all waterfalls in this National Park

land there is no glacier system which excels in beauty and grandeur the system which crowns Mount Rainier in the Mount Rainier National Park. Unfortunately, the reason for the small amount of travel to the high mountains of California is the fact that so little information has been disseminated to the general traveling public, but it is hoped that the federal government will within the near future establish a bureau of information regarding the merits of the national parks which will adequately fill this long felt want.

SEQUOIA AND GENERAL GRANT NATIONAL PARKS

The three national parks of the State are in the Sierra Nevada. Sequoia, the most southerly, was originally set aside for the purpose of preserving to posterity a magnificent grove of *Sequoia gigantea*. Little or no attention was paid to the scenic values of the area set aside other than the merits of the Sequoia groves. There are, however, within the boundaries of the park many features of interest in addition to the giant forests. There is, for instance, running through the center of the park in an easterly and westerly direction, the great Kaweah Canyon, which at one point is over one mile in depth, and there are within the area of the park over one and one-quarter million *Sequoia gigantea* trees. This park was set aside on September 25, 1890, and contains 161,597 acres.

The record of tourist travel shows that people from practically every civilized nation in the world are annual visitors to this national park. It is difficult to conceive of anything more magnificent or more awe inspiring than the view of these giant forests. This is the only area in which the *Sequoia gigantea* is found in all ages from 20 years to 8000 years, and there is a contrast ever evident of great age and virile youth. It is difficult to appreciate as one stands contemplating a tree 250 feet in height and thirty feet in diameter, containing as many board feet of lumber as may be estimated in a cruise of sixty acres of good timber land, that its great towering shafts were 6000 years old when Christ was born. A visit to the groves of these trees,



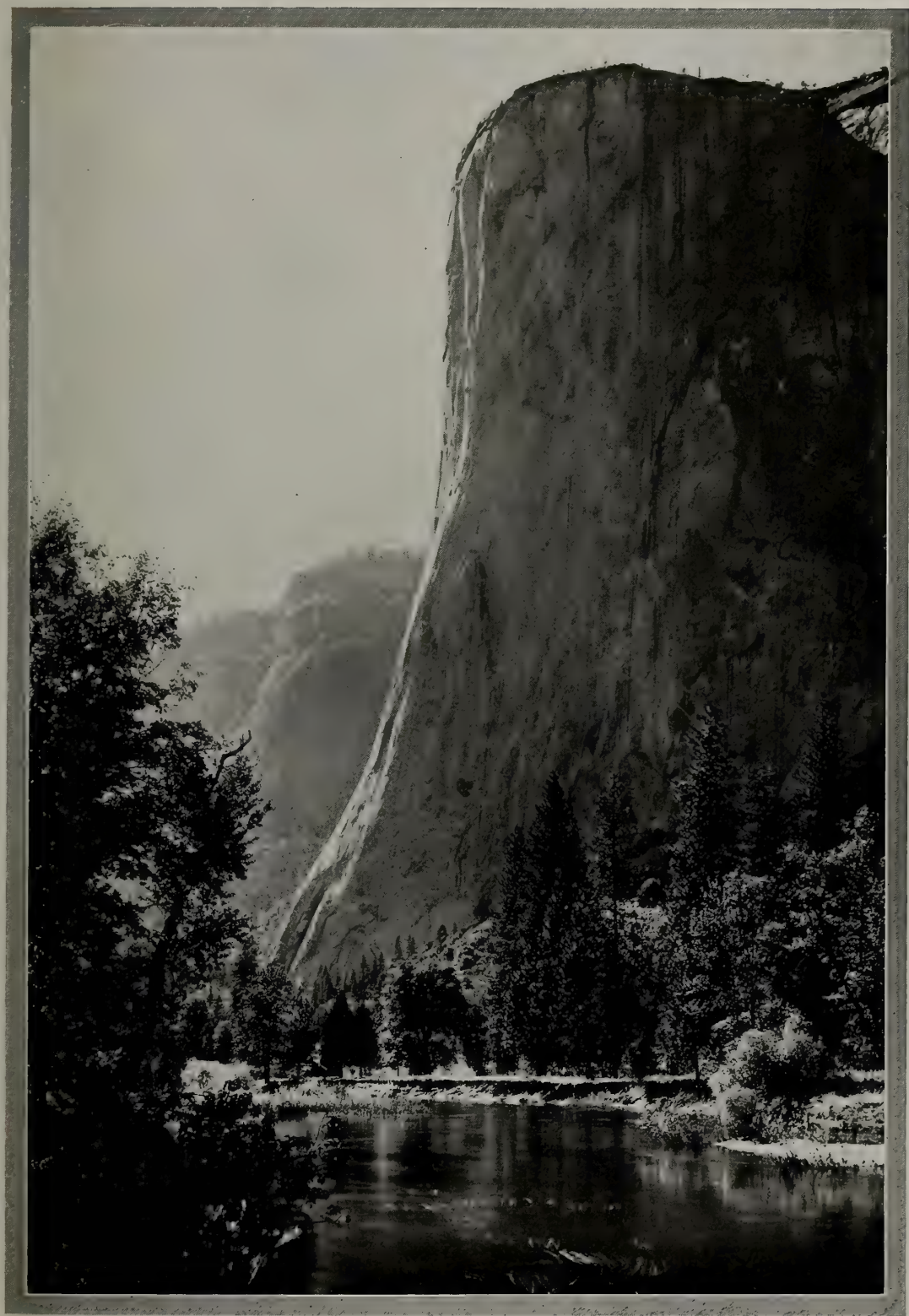
A typical California Redwood



Cathedral Spires, Yosemite—one of those numerous places in the great valley which awe the visitor to silence and carry his thoughts to almost divine heights



Deer Horn Mountains from Bryan's Lake, near Kings River Canyon



El Capitan stands sentinel eternally over the Valley of Enchantment

from between whose towering shafts one may at noontime clearly see the stars, has the most salutary effect. People frequently arrive in noisy parties and depart speaking in whispers. Truly if there is any place where it may be said that men "came to scoff and remained to pray," Sequoia National Park is that place.

General Grant National Park is a small area just north of Sequoia, containing 2536 acres which was set aside October 1, 1890,

Fishing is excellent in both parks and the roads are open to automobiles.

The Sequoia and General Grant national parks are situated in Tulare and Fresno counties. The former may be reached from Visalia on the Southern Pacific and the Atchison, Topeka and Santa Fe railroads, and Exeter on the Southern Pacific, thence by way of the Visalia Electric Railway to Lemon Cove, thence forty miles by stage or private convey-



Middle Fork of Kings River Canyon from Inspiration Point

for the purpose of preserving an isolated grove of *Sequoia gigantea*, and was named after the greatest tree in the grove, the General Grant. Nestling on its western border is a small mountain lake, and in its confines are numerous exquisite bits of scenery.

There are accommodations in both Sequoia and General Grant national parks for tourists, consisting of tent cottages and a general dining room. In each of the parks are complete equipments of saddle horses and pack animals for trips through the mountains.

ance to Camp Sierra in the park. This road is through a panorama of scenic wonders. Stages leave Lemon Cove for Camp Sierra three times a week during June, and daily except Sunday for the remainder of the season. Similar service is provided from the camp. The fare is not excessive.

General Grant Park can best be reached from Sanger on the Southern Pacific Railroad, thence by auto stage or private conveyance a distance of forty-six miles to the park. Stages leave Sanger daily for Hume, via the

park. General Grant Park can also be reached from Cuttler Station on the Atchison, Topeka and Santa Fe Railroad, thence by stage or private conveyance by way of Orosi and Badger to the park, a distance of thirty-nine miles. This park may be reached from Dinuba and Reedley on both railroads.

Between June 15 and October 1 is considered the ideal period for visiting either of these two parks, the weather during that time usually being pleasant.

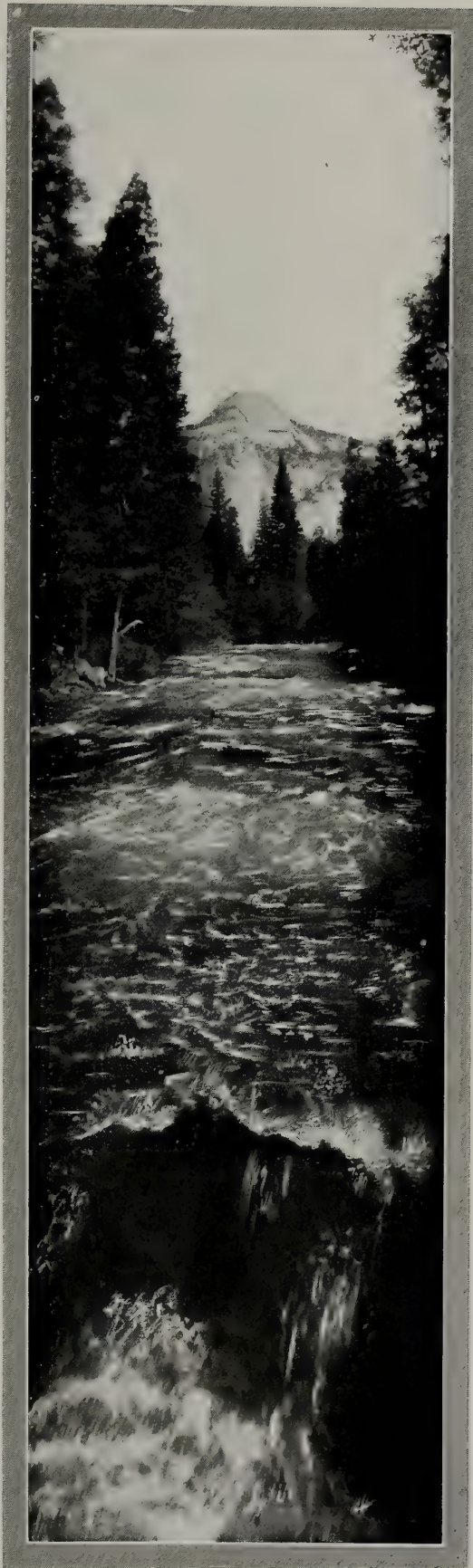
Ideal for trout fishing, boating and bathing are the streams and lakes in these parks. The waters are all pure and good for drinking purposes. In the forests are the oldest and largest trees in the world. Not only the giant Sequoia, but pines, fir, cedar and deciduous trees abound, while the wild flowers, ferns, mosses and shrubbery, together with the myriad of smaller wild animals and song birds, make the country a never-ending source of delight to the lover of nature.

The Yosemite National Park has been justly called the incomparable. It was set aside October 1, 1890, and contains 719,622 acres. There is no equal area in the world which contains so many wonders of nature, magnificent scenes, glorious growths of flowers and forest trees. It is most unfortunate that the average tourist who goes to the Yosemite National Park visits little more than the Yosemite Valley and its immediate vicinity.

This valley is a great chasm approximately one-half mile deep with vertical side walls hewn out of living granite by glacial action over which pour a series of rivers and small streams. The floor of the valley is at an elevation of approximately 4000 feet above sea level and the tops of its wall vary in elevation from 6000 to 8000 feet.

The description of its scenic wonders is a monumental task which defies the art of any writer. All that can be said is that any description which may be written about this park must fall short of the glories of an actual visit.

The Yosemite Village is on the floor of the valley and there are in this village accommodations of varying character for tourists, together with every form of transportation necessary for visiting the high mountains in the



North Dome and a section of the Merced River

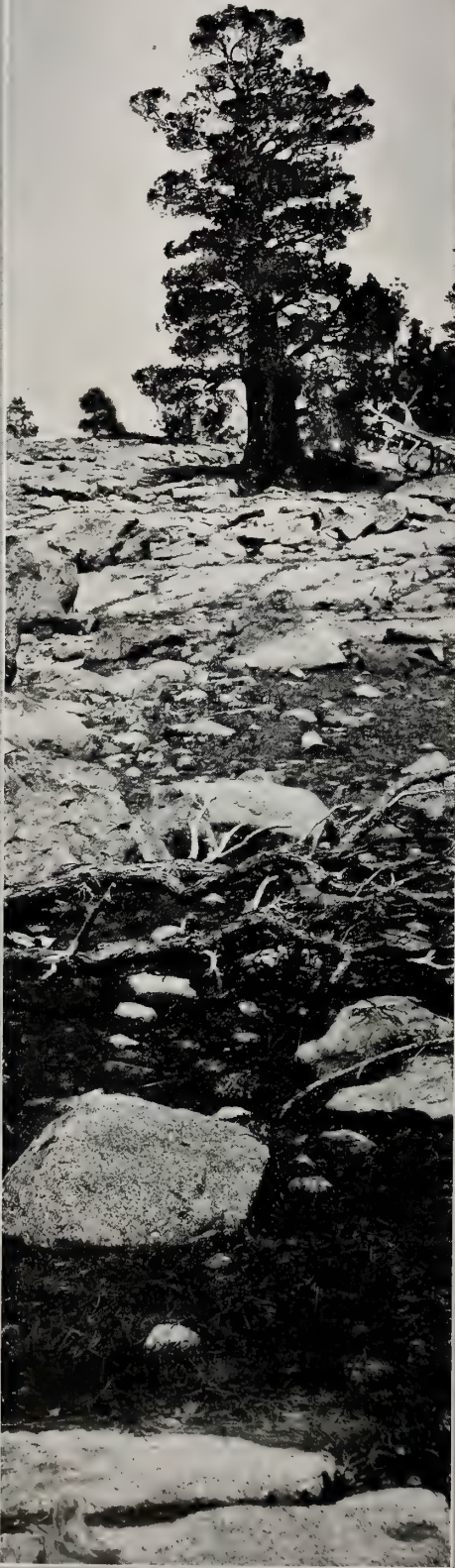
park, and there are sufficient wonders and views of magnificent scenery within a day's horse-back ride from the valley to justify several seasons' visits to the park.

In the early summer the river banks and forest glades are massed with azaleas, and there is throughout the valley the gentle hum of waterfalls. A few hours' ride on horse-back brings one to the top of the canyon walls, from whence can be seen one-half mile below the quaint mountain village nestling at the base of a half-mile high cliff over which pours a roaring, snow-white river. Looking to the east, miles upon miles of ragged, saw-tooth crest of the Sierra Nevada is clearly visible with the great snow banks and glaciers.

In the higher areas of the park are numerous lakes which are fully stocked with game fish which make the back mountain country the fisherman's paradise. Fortunately these lakes are sufficiently numerous to make it not more than a few hours' journey from one to another, so that camping may be conveniently practiced in traveling from lake to lake. There are trips from headquarters in the valley to fit the convenience of any tourist: One-day trips, two, four, six, eight and up to twenty-day trips, traversing practically every variety of mountain scenery that can be found anywhere in the world. There are in the park three groves of *Sequoia gigantea*; on the eastern border is Mount Lyell, with its glaciers and vast snowfields; traversing the park north of the valley the Tuolumne and its canyons and waterfalls; while along the eastern border of the park runs the broken crest of the Sierra Nevada.

The Department of the Interior is now taking steps to develop these parks in California and to make them open to tourists in a manner closely resembling the system of accommodating mountain climbers that is so popular in Switzerland. It is devoutly to be hoped that the traveling public will respond with the attention that these mountains so thoroughly warrant and justify.

The park is open to automobiles and may be reached by three different roads of entry—the Coulterville, the Big Oak Flat and the Wa-



Lone Juniper tree in the Sierras

wona roads. The Coulterville road enters the park via Coulterville and Hazel Green and passes through the Merced Grove of Big Trees; the Big Oak Flat road enters via Stockton, Chinese Camp and Crockers and passes through the Tuolumne Grove of Big Trees, while the Wawona road enters from the south via Raymond and Wawona. The rail transportation to the valley is via Santa Fe or Southern Pacific to Merced; thence via the Yosemite Valley Railroad to El Portal; thence by auto bus up the canyon of the Merced practically along the entire length of its wonderful cascades to the floor of the valley.

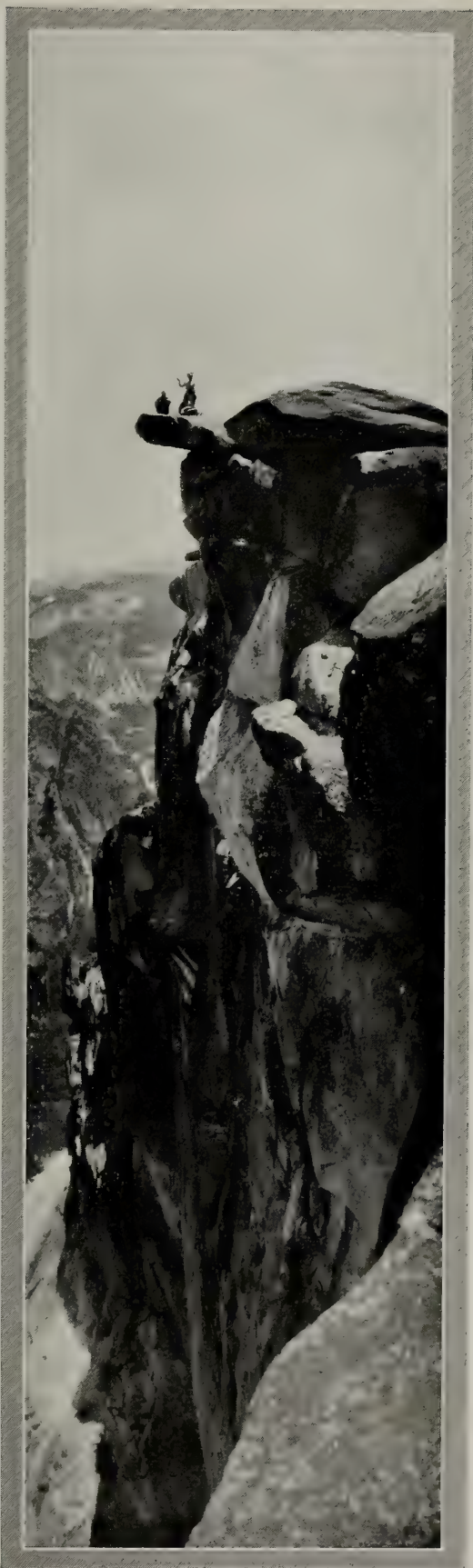
While every provision is made for the enjoyment of the park by visitors, strict rules are provided and enforced, to the end that no one may be the sufferer by another's thoughtlessness or maliciousness. Likewise extraordinary precautions are taken against disastrous fires which might be caused by careless campers or smokers.

One rule particularly gives an idea of the extent to which the government has gone to insure the pleasure of those who are its guests temporarily in this wonderland of nature: There is a body of water called Mirror Lake; so placid and clear are its limpid depths that the fabled fountain in which Narcissus is reputed to have caught his reflection might well have been a Missouri river by comparison. Rule 5 declares that no one is allowed to throw anything into Mirror Lake, thereby causing ripples and disturbing the reflection, which "all are entitled to behold."

Extreme caution is urged in all methods of transportation and particularly with regard to automobiles, which were recently admitted to the park. Motorcycles are not permitted.

Pages might be written depicting the wonders that burst upon the vision of the tourist in Yosemite at every turn, but as has already been indicated, no pen is adequate to describe with justice the actual grandeur, matchless beauty and impressive character of this epic poem of Nature. A visit is essential to a conception of what it, as well as California's other national parks, offers those in search of scenic wonders.

Overhanging Rock, Yosemite National Park, from which a comprehensive view may be obtained of the entire valley





Mirror Lake, Yosemite. So still that never a ripple disturbs its absolutely placid surface



Half Dome, Yosemite, in mid-winter

Lumbering in California

By G. X. Wendling

President of the Weed Lumber Company of San Francisco

Editor's Note: Mr. G. X. Wendling in his highly interesting as well as authoritative paper discusses the great lumbering industry in the State from the viewpoint of the practical business man as well as from that of the student of the tree from twig to bole. He also includes some consideration of the national situation in this direction and his figures and comparisons are valuable and instructive. As president of a large lumbering concern and one of the largest lumber operators in the State, Mr. Wendling has studied the subject from all angles and has, so to speak, made of it his life-work.

IN THE early days lumbering was carried on entirely as a local industry, the miners using the timber near at hand necessary to the construction of mining cabins, etc. The materials were in the main split or rived for wall boards, and shakes for roof or covering materials, as sawmills had not made their way into California at that early period, but the forests offered the natural materials for ready conversion, and the hardy pioneers made good use of them in fitting their needs, and this emphasizes the fact that man's real needs are, after all, quite simple until he outgrows his real wants, when artificial culture puts other and unnatural burdens upon him. But with the growth of population and the improvement of transportation facilities, there came into use in various parts of the State, the small saw-milling operators whose output has with time expanded into the larger productions, many concerns now producing up to the 100,000,000 feet mark annually.

A brief reference to the lumbering industry nationally is, I think, in order as an indication of its general scope:

IN THE UNITED STATES

Statistics in Detail—There are about 40,000 establishments, employing in round figures about 800,000 persons; about 50,000 are proprietors and

firm members; about 20,000 are salaried officers, superintendents, and managers; about 18,000 are male clerks; about 8000 are female clerks and stenographers; the average number of wage earners about 700,000.

Value of Production 1909 Most Recent Statistics Available—Approximate value of production in 1909, \$1,156,128,747, plus value added by manufacture, \$648,011,168, reaching in commercial value nearly \$2,000,000,000.

Standing Timber on the Pacific Coast—Standing timber in the following enumerated Pacific Western states is as follows:

	<i>Feet</i>
Montana	65,000,000,000
Idaho	129,100,000,000
Washington	391,000,000,000
Oregon	545,800,000,000
California	381,000,000,000

Total1,511,900,000,000

California having 381,000,000,000 feet of standing timber, valued at \$3 per 1000 feet, reaches the generous dollar value total of \$1,143,000,000, a financial resource worthy the profound admiration of the king or emperor of any nation, and yet we, who are the natural heirs of this vast property, being a part of it, seemingly accept it as a matter of course, and one is reminded of the fact that many men and women of California, who were born within twenty miles of one of nature's greatest pieces of natural architecture, the Yosemite Valley, have never seen the valley and its wondrous attractions.

The value of the California stumpage is governed by the quality of the timber—quantity in any given area, accessibility and ease of operation. The logging costs vary in different localities, running from \$4.50 to \$7, including the cost of railroad building, which can be roughly estimated at \$1 per thousand feet. This holds good generally throughout the Pacific Coast states.

Redwood—In California we encounter a very different forest growth from the timber in Washington and Oregon. Here we have, in addition to the pine family, that wonderful redwood, common only to California, botanically known as *Sequoia sempervirens*. This wonderful member of the cedar family, in fact the mastodon of the entire cedar group, finds its habitat mainly in the counties of Del Norte, the northeastern county of the State, extending southward through Humboldt, Mendocino, Sonoma, Marin, and to a limited extent into Santa Clara and Santa Cruz counties.

Some groves of the redwood family are found in the Sierra Nevada range of mountains, though they are viewed mainly in the light of ornamental groves, where sentiment has decreed, as in fact it should, that these vast forest giants, many thirty feet in diameter, should continue to stand, as they have stood throughout countless ages filling the wandering savages with wonder and civilized man with awe. "The woodman's axe" should spare these trees that were old when Babylon was an empire.

The redwood forests range in extent from the southern border of Oregon to Monterey, a distance of some 600 miles, but the main forest from a commercial standpoint is located in Del Norte, Humboldt, and Mendocino counties. The growth is generally very dense, averaging about 50,000 feet per acre; the trees are large, reaching a diameter of twenty feet, and a height as great as 350 feet. In beauty and majesty these redwood forests stand in a class by themselves, and are easily the lords of the forests. The family aggregates about 75,000,000,000 feet.

Production—The annual production is about 600,000,000 feet, hence the visible supply at this writing is ample for 100 years' cutting.

Uses—Redwood has no wood competitor for foundation timbers, being almost impervious to decay. For general finishing lumber, window frames, door frames, mouldings, house siding, shingle and other general building purposes, it stands in a class by itself, as it resists moisture and decay wonderfully, and likewise resists fire more successfully than any wood fiber on the market.

Mode of Harvest—The forests being so vast as to size, call for the largest logging equipment; many of the logs are blasted in the process of logging, otherwise they would be too large for standard railway equipment.

Logging—Logging methods in the redwoods have been undergoing changes in recent years, as indeed is the case in all lumbering, but especially in redwood, where with the experience of years, machinery has practically taken the place of the earlier methods, where the ox team had undisputed sway, and now logging is carried on at perhaps 60 per cent of the cost of the earlier and more primitive methods.

Fire Hazard—Fire in the redwoods is like the Dutchman's coon, "a seldom animal," in fact the method of harvesting redwood consists of: Falling the trees, cross-cutting the trees to the desired lengths, limbing the trunks, peeling the bark, then setting fire to the debris. No harm results; on the contrary much effort is expended in keeping the fires sufficiently aflame to clean up the rubbish.

Redwood possesses the wonderful quality of being the safest shipper green from the saw direct to the ship's hold, standing transportation to any part of the world without injury; in fact, transportation in this condition has the effect of partially seasoning the wood.

Wood stave pipe for water mains, sewer pipe, and other conduits has come into general use in the last twenty-five years; in this construction redwood has proven king and in this particular field it has won the title of "The

Wood Eternal," on account of its lasting quality when placed in the ground.

Sugar Pine (or Pinus lambertiana)—This wonderful tree is found on the Pacific Coast only, ranging in territorial extent from Central Oregon in the Cascade Range southward for a distance of about 1200 miles through Central California in the Sierra Nevada Range. These sugar and white pine trees grow up to twelve feet in diameter and reach a height of 250 feet. The wood is soft, of a creamy white color, and is generally useful for the same purposes common to the white pines of Michigan, Wisconsin, and Minnesota, and usually growing in a mixed forest carrying about an equal quantity of white pine (or *Pinus ponderosa*), and other woods, such as white fir (or *Abies concolor*), and red fir (or *Abies magnifica*). Here it is rather a common remark among California lumbermen that our forests run about one-third sugar pine, one-third white pine, and one-third white and red fir and some incense cedar, valuable for the manufacture of lead pencils; in fact, the pencil manufacturers of the world must look to California for their future supply of cedar for pencils.

Logging—Logging operations in these forests are the most modern methods known to the art, and it is really an art as now conducted.

Elevation—These forests are found generally in an elevation ranging from 1500 to 7000 feet. The choicest growth is found in elevations ranging from 3000 to 5500 feet above sea level.

The fire hazard is regarded nominal, as the operators clean up and burn the slashings, taking care to protect the young growth for future use.

Uses of White and Sugar Pine—Pine is mainly useful for general building lumber. It makes a beautiful house finish and trim, possesses exceptional value for doors, windows, blinds, and as a veneer material has no superior in soft woods, being entirely free from face checking. As a material for the manufacture of box shoo pine is king, as the shoo

when manufactured and ready for use may be shipped to any climate free from checking. In California the fruit products are packed in the main in white and sugar pine boxes and these containers are manufactured from the lower grades.

The annual consumption of raw material for this purpose reaches the generous total of about 200,000,000 feet annually.

Sugar pine as a pattern material and for piano keys outranks all known soft woods, as it is not subject to expansion or contraction after being thoroughly seasoned.

The principal uses of the lumber products may be summarized as follows:

In the pine members of the general forest found in the main in the higher Sierra Nevada Range, we have practically an inexhaustible supply. These forests supply materials for general construction throughout interior California, but are not shipped to the seaboard cities for construction purposes, as Oregon fir has from the earlier days held the trade in the bay cities of San Francisco, Oakland, Alameda, Berkeley, Stockton, Sacramento, San Jose, and smaller towns in the region where these cities are located. This is also true of Southern California south of the Tehachapi Range, or to generalize, all Southern California receives its building lumber from Oregon and Washington, in fir—its redwood (in the main), from the coast counties of Del Norte, Humboldt, and Mendocino.

Production—The production in California at this writing aggregates about 500,000,000 feet annually; hence with a standing resource in California of 381,000,000,000 feet we may assume that, at the present rate of cutting, we have a supply for about 800 years.

Comparison—In conclusion, a comparison of Pacific Coast sugar and white pine with the wonderful forests of white pine originally standing in Michigan, Wisconsin, and Minnesota, may not be out of order.

The forests of those states served a double purpose, in that as they were cut away the lands were cleared for the building of homes for the farmers; the expansion of the lum-

bering camps into the cities of Detroit, Saginaw, Grand Rapids, Madison, St. Paul, Minneapolis, Duluth, etc., has made a civilization worth perhaps millions of times more to commerce and society than if the entire forests were standing there today in their primeval naturalness; and yet a greater purpose was accomplished, in that as the forests disappeared in those states, the lumber thus produced was supplied to build the homes, barns, and fences of another civilization in the prairie regions of Indiana, Illinois, Iowa, Kansas, Nebraska, the Dakotas, and Western Minnesota, making it possible to quickly develop that country, which has become the nation's granary.

May we not hope for similar results as our forests disappear, though with us of the Pacific states, our forests are so vast that we will be busy for centuries removing them, though every quarter section, when cleared of its forests, where the lands are fertile, is worth easily double, and more, for agriculture, horticulture and dairying purposes, than with the timber standing.

A word as to how the dollar in lumbering in California is distributed may be interesting to the readers of the "California Almanac" as well as the approximate amount paid in wages annually. The total amount distributed to the workmen is about \$25,000,000 yearly.



THE BEST WAY

THEODORE ROOSEVELT in "*The Metropolitan*" for March

JAPAN is already playing a very great part in the civilized world. She will play a still greater part in the future. It may well be that she will prove the regeneration of all Eastern Asia. She and the United States have great interests on and in the Pacific. These interests in no way conflict. They can be served to best purpose for each nation by the heartiest and most friendly co-operation between them on a footing of absolute equality. There is but one real chance of friction. This should be eliminated, not by pretending to ignore facts, but by facing them with good-natured and courteous wisdom. Each country should receive exactly the rights which it grants. Travelers, scholars, men engaged in international business, all sojourners for health, pleasure, and study, should be heartily welcomed in both countries. From neither country should there be any emigration of workers of any kind to, any settlement in mass in, the other country.

California State Forestry Work

By G. M. Homans

State Forester of California

Editor's Note: Before the national government took up forestry work in California the State of California provided for the guarding and extension of forests, beginning with a law organizing and providing for a State forestry commission in 1885. Some years later new laws were passed, a new commission organized, and more definite protective and promotive work has been done. For nearly ten years this work has been under direction of Mr. G. M. Homans, who has prepared an article showing what California is doing for forest production, encouragement of reforestation, and tree planting generally.

LONG before the federal government set aside any natural forest reserves in California our State Legislature created a board of forestry which acted largely in the capacity of a commission of inquiry with emphasized educational functions. Police powers were conferred in 1887; and the first real achievement of the board was the publication of three valuable reports on the forest conditions and forest trees of the State.

Previous to 1905, at which time a new forest law was made and a new board created, the State spent several thousand dollars in co-operation with the federal government with the purpose of obtaining a suitable forestry bill. A study was made of the State preparatory to launching such a forest policy. The purpose of the law is to protect the great forest resources of the State for the benefit of the greater number of citizens and to stimulate a wholesome activity along forestry lines.

VOLUNTARY FIRE WARDENS

The state forester is authorized to appoint

voluntary fire wardens in and for whatever localities he deems such appointments necessary. There are now about 1300 voluntary fire wardens active in the endeavor to prevent and suppress forest and range fires throughout the entire extent of California. These men are vested with police authority and can arrest, without warrant, any violator of the state and federal forest laws. The State is able to effectively co-operate with the federal forest service through the conferring of police power, by the state forester, upon all rangers and other forest officers in the employ of the federal government within California. However, such police power is not given to a man unless he is recommended by a superior officer unless, in the discretion of the state forester, the authority may be given without recommendation. The first qualifications for a fire warden are courage and fortitude. Often he is required to remain in charge of a fire-fighting crew for several days with little or no sleep and as little food. Perhaps we have no

IT IS a gratifying thing to know that California's magnificent forests are in good hands—that the government has competent men in charge who will see to it that the homes of the trees are not violated ruthlessly.



A magnificent redwood forest—one of the wonderful scenes on the new Overland

better opportunity than here to express our appreciation of the valiant assistance and work of the voluntary fire wardens. They have done much toward decreasing the damage likely to be occasioned by forest fires.

Our present state forest laws further provide that it is a misdemeanor to set a fire on any property within the State without first taking every reasonable precaution to prevent the fire getting beyond control. A great many damaging fires in the past have originated because such precautions were not taken. Furthermore, if a fire gets beyond control and burns over land belonging to another, the person damaged thereby can recover damages by civil suit against the responsible person. In this way the State aims to protect its citizens justly against injury due to neglect or carelessness. The forest laws provide for severe punishment for incendiaries.

The state forester conducts special field

studies and investigations directed toward the public good. The reports of these investigations are published and distributed at no cost to those who wish to receive them.

The State has recently passed a law making it possible for any county to organize a county board of forestry for the purpose of conducting local forest activities. Several counties have already taken advantage of this provision and are doing commendable work along the lines of park and highway planting. The state department stands ready, at all times, to assist the counties by giving helpful suggestions, and by encouraging forest and highway planting. Although the State is not in a position to distribute trees for planting, the state forester is very frequently called upon to study certain localities with reference to suitable systems of planting. The correspondence relative to this phase of the work is naturally large since many inquire as to appropriate



Between San Francisco and Eureka.—*Courtesy of Northwestern Pacific Railroad*

species for planting in their respective localities.

Throughout the State there is a growing sentiment in favor of community protective associations. These communities receive the hearty support of the state board of forestry and are greatly assisted by the State in organizing and outlining the scope of their work. A few associations, now fully organized, are accomplishing much in forest protection and improvement.

EDUCATION IN FORESTRY

One great phase of the State's forestry work is that of education. Publications are issued by the state forester, from time to time, relating to matters of state-wide interest in forestry. A few of the recent publications, now ready for free distribution, are:

The Fourth Biennial Report of the State Forester, Pharmacal Plants and Their Culture, Wood-Using Industries of California,

Fire Prevention Day—A Lesson, The Forest Protection Problem in California, Annual Fire Report, 1913, Handbook of Forest Protection, Street and Highway Planting, Fifth Biennial Report of the State Forester.

The office collection of descriptive views is constantly being enlarged and illustrated lectures are freely given before schools, clubs, and associations upon request.

Forestry is a subject that will ultimately occupy a great deal of attention in California. Our forest resources, third in extent, place us in a position to look to their perpetuation, protection and proper use. Our purpose is to so endeavor and so organize our efforts as to insure to future generations an enjoyment of the majestic forests, the unexcelled scenic wonders, the inexhaustible industrial activities, and the abundant field for the sportsman, equal to, if not better, than what we of California have today.



Nature's Imposing Gateway to the Great Yosemite Valley

The National Forests of California

By Coert DuBois

District Forester Fifth District U. S. Forest Service, San Francisco

Editor's Note: Mr. DuBois in his article estimates the value of Uncle Sam's forest resources within the limits of California at \$250,000,000. He proceeds to describe in most interesting detail what Uncle Sam is doing to preserve and protect his California property and to make it productive in a modern, scientific forestry way. He shows exactly what the relations are between this great national undertaking and the general welfare of the State and the industries, recreations, and welfare of individuals. Besides these considerations the details of organizations and the duties of the various officials in the eighteen distinct national forest reservations in California are very interestingly set forth.

ALTHOUGH they occupy the roughest and most mountainous portions of the State, the national forests in California contain resources which may be conservatively valued at \$250,000,000. They protect the sources of nearly all the streams that supply the State with water and water power. They contain about one-third the timber of the State. They provide forage for a large proportion of the State's live stock industry, and they furnish recreation grounds for thousands of citizens not only of California but of other states as well.

During the fiscal year that ended June 30, 1914, the national forests in California furnished 57,000,000 feet of timber; provided forage for 189,451 head of cattle and horses, and 433,058 head of sheep and goats; developed 70,221 hydro-electric horse-power;* and yielded a rental of \$16,258 for 3599 spe-

cial uses of various kinds. The total receipts during this period amounted to \$260,007.34. Under the law, the State receives 25 per cent of the gross receipts for the benefit of its schools and roads, and an extra 10 per cent is expended by the Secretary of Agriculture within the State for public roads and trails. This amounted to \$91,000 during the last fiscal year.

The expense of administering the national forests is borne entirely by the federal government. The annual appropriation for this purpose for the forests in California amounts to a little over \$770,000. Since the net receipts after deducting the \$91,000 that is expended for the benefit of the State amount to about \$179,000, the net cost of administering the national forests is, therefore, in the neighborhood of \$600,000 a year.

The principal item of expense is for the protection of the forests from fire.

The value of the improvements built to further the administration of the national

*Permits have been issued for ten times this amount, and the works are now under construction.



Harvesting the forage crop on a National Forest. Beef Cattle being gathered in the fall from a timbered range in the Sierras.—*Photo by U. S. Forest Service*

forests in California amounts to \$814,257. These consist of 258 miles of road, 3886 miles of trail, 3663 miles of telephone lines, 413 miles of fire breaks and fire trails, sixty-eight bridges, and numerous lookout towers, dwellings, fences, corrals, etc.

NATIONAL FOREST POLICIES AND PURPOSES

National forests are set apart to insure a perpetual supply of timber for the use and necessities of the people of the United States, and to prevent destruction of the forest cover which regulates the flow of streams. They are "open to all persons for all lawful purposes. The timber, water, pasture, and other resources are for the use of the people, and the minerals are open to exploitation just as on the unreserved public land."*

The distinction between national forests and national parks should be clearly understood.

*The Use Book: A Manual for Users of The National Forests, July 1, 1913. Copies may be obtained free of charge on application to the District Forester, 114 Sansome Street, San Francisco.

The purpose of the latter is chiefly esthetic. Whereas the national forests, although they are largely used by the public for purposes of recreation, have a primary purpose that is strictly utilitarian. Originally the national forests were called forest reserves. The name was changed by Congress in order to bring out more clearly the point that the resources of the forests are to be used. The national forests are reserved in the sense that certain of the land laws which apply to the public domain are not effective on the forests; but none of the resources are reserved from use except in occasional cases where one use is incompatible with another. The mature timber in national forests is for sale, and is cut as the market demands it. Only stumpage is sold, the title to the land and the immature forest remaining in the ownership of the people.

Timber is sold in amounts ranging from a few thousand feet up to whatever amount may be necessary to warrant the investment required for constructing a railroad or other

means of transportation into comparatively inaccessible regions.

Forage resources are sold under regulations whose leading objects are the protection and conservative use of all national forest land adapted for grazing, the permanent good of the live stock industry through proper care and improvement of grazing lands, and the protection of the settler and home builder against unfair competition in the use of the range.

Claims may be initiated upon lands within national forests under the mining laws, the coal land laws, and the forest homestead act. Prospecting is not interfered with in any way. Timber may be used free of charge by bona fide miners and prospectors who may not reasonably be required to purchase and who have not on their own claims a sufficient or accessible supply.

The national forests contain water powers of great value. Permits for the development and use of these water powers are granted

under regulations which seek to prevent the appropriation of power sites for speculative purposes, to secure prompt and full development, to prevent monopoly, and to secure a reasonable compensation to the government for the use of the land occupied and the beneficial protection given to the water shed.

Timber, stock range, water power, summer resort sites—these are the natural resources of the national forests waiting upon individual enterprise for commercial development.

But there is still another resource in the forests which is being used every summer by the general public, thousands of them, non-commercially and free of all charge, and that is the opportunity for camping in the mountain forests. The habit of roughing it in the woods in summer is strongly ingrained in the Californian and is a very real factor in California's public health and happiness. With all of the attractive wild lands outside the national forests passing rapidly into private ownership



Where Nature's forces are Harnessed by Man—45,000 Horse-power put to beneficial use at a hydro-electric plant on one of the National Forests of California



Naval stores are now an undeveloped resource of the California National Forests. These tapping experiments conducted by the U. S. Forest Service show that the industry is commendably feasible in California.—*Photo by U. S. Forest Service*

and increasing in value as game preserves and commercial resort sites, it is only a matter of time when the forest lands where any man may fish, hunt and camp at will will be restricted to these national forests. Realizing this, the United States service has gone systematically to work to provide for a vastly increased use of these areas by the public of the future. Through organized co-operation with the California fish and game commission, a feature of which is the appointment of every forest ranger as a state game warden, a supply of fish and game is assured for public enjoyment. Strategic areas along popular travel routes are set aside as public camping grounds, and no individual is allowed exclusive use of them. The rangers recognize as part of their regular work the duty of courteously aiding mountain travelers in every possible way by giving them directions as to routes, information on fish or game, or maps.

The administration of the various resources

of the forests and the protection of the forests, especially from fire, constitute the principal work of the forest service of the United States Department of Agriculture.

NATIONAL FORESTS IN CALIFORNIA

There are eighteen national forests in California comprising 20,555,680 acres of government land. Three are located in the mountains of Southern California, one is in the Coast range south of Monterey, and the rest, which contain the heaviest stands of timber, cover the Sierras and northern Coast ranges. Their average size, including the areas within their boundaries not owned by the government, is one and one-half million acres.

General supervision over the national forests in California is exercised by the district forester, with headquarters at 114 Sansome Street, San Francisco.

Each national forest is in charge of a supervisor who plans the work on his forest, under the general direction of the district forester,

and supervises its execution. His headquarters is located in a town situated conveniently to his forest.

Routine work involved in the supervision of timber sales, grazing, free use of timber, special use and other contracts and permits, the carrying out of the protective and improvement plans and other administrative activities is performed by rangers. Each forest is divided into ranger districts of such size that under ordinary conditions all the regular work can be handled effectively by one fully equipped ranger with the necessary temporary assistants. The average ranger district has about 60,000 acres, but where there is only a small volume of business or the fire hazard is low, very much larger districts may be established.

The permanent field force on the forests numbers about 220. As the fire season approaches extra men are put on until at the height of the fire season the force amounts

to nearly 900. When the fire danger decreases with the coming of the fall rains the extra men are laid off.

FOREST FIRE PREVENTION

The fire risk in California is excessive. The long dry season, the inflammable nature of the cover, and the campers during the summer, tend to produce severe fire conditions. Most fires are of human origin. The seasoned camper is by no means a source of fire danger; he is, rather, a safety factor since he knows what precautions must be taken and helps to instruct those who are less experienced. But until a camper has had at least a season's experience in the forests he is apt to take unwarranted chances with campfires, matches, burning tobacco, etc.; and, speaking generally, the more people there are in the forests the greater the risk.

The fire organization on the national forests includes measures designed to prevent, detect, and suppress fires. Absolute prevention is, of



Big wheel logging in a yellow pine stand on a National Forest in Northern California. Under forestry principles between 75 and 80 per cent of this timber is being cut.—*Photo by U. S. Forest Service*

course, impossible—lightning causes a certain percentage of fires each year, and a few fires start in other ways that may be fairly called unpreventable. Among these are the breaking of transmission lines, the accidental burning of houses in the forests, etc. There is also a theory very prevalent in California that broken bottles, by focusing the sun's rays upon inflammable material, are a frequent source of fires, but the theory has never been verified. During seven years in which accurate fire records have been kept in California, not a single authentic case of this sort has come to light.

Two-thirds of the fires can be prevented by educating the public. This the service attempts to accomplish by various devices, but especially by giving currency to the following six rules:

1. *Matches*—Be sure your match is out. Break it in two before you throw it away.
2. *Tobacco*—Throw pipe ashes and cigar or cigarette stumps in the dust of the road and stamp or pinch out the fire before leaving them. Don't throw them into brush, leaves, or needles.
3. *Making camp*—Build a small campfire. Build it in the open, not against a tree or log or near brush. Scrape away the trash from all around it.
4. *Leaving camp*—Never leave a campfire, even for a short time, without quenching it with water and then covering it with earth.
5. *Bonfires*—Never build bonfires in windy weather or where there is the slightest danger of their escaping from control. Don't make them larger than you need.
6. *Fighting fires*—If you find a fire, try to put it out. If you can't—get word of it to the nearest U. S. forest ranger or state fire warden at once. Keep in touch with the rangers.

The work of detecting and suppressing forest fires has been greatly systematized in recent years. Nowadays, fires are reported mainly by lookouts whose function is not to fight fires but merely to discover and report them. The lookouts are located on commanding peaks, and remain on duty continuously. They are equipped with the necessary instruments and housed in cabins, from the interior of which the entire area under protection can be kept in view. Each forest has several lookouts. Where the same area is under observation from two or more, the location of a fire can be determined very accurately by triangu-

lation even at a distance of many miles from either.

The lookout is in communication with the ranger either by telephone or by heliograph. Telephone service is the most certain and satisfactory, but heliographs are used in situations where other facilities are lacking or are too costly. On receiving a report from a lookout, the ranger in whose district the fire is located takes immediate steps to put it out. His assistants are stationed at various strategic points, each connected by telephone, and they remain within hearing distance of the bell. In fighting a forest fire it is as necessary to be prompt as it is in saving a burning house. For this reason the forest firemen are kept at their stations in constant readiness. This system has proved to be very economical. Instead of having large fires to fight, the majority of fires are kept to an area under one-quarter of an acre and are handled by one or two men at the most.

When large fires occur, due to exceptional circumstances, large bodies of fire fighters may be required. These are so far as possible organized in advance so that no time may be



Logging on a National Forest in California; the incense cedar which is falling will eventually be manufactured into lead pencils.—Photo by U. S. Forest Service

lost. They are recruited from nearby ranchers, stockmen, lumbermen, and even from the settlements outside. Transportation facilities, both for the men and for their subordinates, are also arranged beforehand, and tools and non-perishable food supplies are cached in places where a demand for them is likely to arise.

In the more thickly settled portions of some forests, especially where there are numerous occasional visitors from nearby towns, moving patrolmen are employed. These, by calling the attention of campers to the necessity for taking proper precautions and even by their very presence, keep a great many fires from starting. They also attend to the extinguishing of such fires as occur, and in the case of large fires take charge of the fire fighting until their superiors relieve them.

The system thus briefly described handled 1628 fires on the national forests of California during the season of 1913. This was an exceptional year for electric storms, lightning having caused 804 fires, or nearly half the total. Thirteen per cent of the fires were caused by campers. The total area of forest burned was a trifle less than 90,000 acres; 10,418 acres being timber land and the remainder brush or grass land. Only 275 fires attained an area larger than ten acres, and 912 were caught and put out before they had covered a space of 100 feet square.

One additional phase of fire protection work should be mentioned, namely, the safeguarding of dangerous areas either by reducing their inflammability or by constructing fire lines around them. Obviously, the simplest way of cleaning up considerable areas that are in dangerous condition is by the careful use of fire. The debris resulting from the cutting of timber under the timber sale regulations would form a serious menace to the young growth from which the future forest will be derived, unless it were disposed of somehow. The usual practice is to require that the purchaser of government timber pile the brush, tops, limbs, and other debris in piles of suitable size, which are fired at the proper season by the rangers.

A few years ago the opinion was very preva-

lent in California that the entire forest area should be burned over periodically in order to effect a general cleanup. This theory is now very largely discarded, and properly so. There are certain arguments in favor of it, but it is chiefly based upon conceptions that are fundamentally wrong. In the first place, although it appears to cost nothing, it is in reality an extremely expensive measure when performed effectively. Advocates of this theory—the so-called “light burning” theory—assume that it is only necessary to touch off a piece of forest at the proper season and that the fire will do its work without further attention. This is by no means the case. It is obvious that there are many areas that fire should be kept out of at all hazards, or, if they are to be burned at all, should be burned with extreme care. This means, then, that the fire must be kept under control—which would entail prohibitive expense as compared with the cost of keeping fires out entirely. One large tract in the Northern Sierras was cleaned up in this fashion at a cost of 50 cents per acre. At the same rate, the expense of light-burning the whole yellow pine belt in California would amount to at least \$5,000,000.

But besides the prohibitive cost there are two other objections to this practice. One is that the young growth is inevitably destroyed; in fact, since thickets of young growth are especially inflammable, it is one of the objects of light burning to consume them. But the forests of the future can not be created all at once when they are needed. They require a development period of at least one hundred years before they produce material fit to cut into lumber. Any system which protects the mature timber at the expense of the young growth which is to replace it violates the principles of forestry, and, unless the sacrifice is absolutely unavoidable, of common sense as well. It was formerly argued that this sacrifice was necessary; that unless the debris which collected on the floor of the forest year after year was burned, unless the thickets of young growth were kept down, the final result would be a conflagration that nothing would control. This argument upon examination is

found not to hold. The record of the forest service in California during the last year proved that very severe fire conditions could be handled without any considerable loss of timber.

But, what is more important, it is found by experiment that burning decreases the amount of litter, not for a period of years, but at most for an interval of a few months. The litter upon the ground at the time of the burning is consumed, but is replaced with more than normal rapidity by the debris shed from the trees scorched by the fire.

In short, light burning—in order to make the forest safe against future fires—must not be “light,” but must be a fire of exactly the sort that it is the object of the practice to prevent. Fortunately, the light burning method is no longer advocated to any great extent.

CALIFORNIA FOREST RESOURCES

The national forests in California contain an estimated stand of 100,000,000,000 feet of merchantable government-owned timber, consisting of pine, fir, and cedar. About 60,000,000 feet a year are being converted into lumber, but a large portion of the stand is well along toward maturity and several times the present cut could be removed annually with benefit to the stand. The government is, therefore, anxious to dispose of the mature timber when conditions permit. Thus, wherever market conditions warrant the installation of new plants, excellent opportunities are offered by the national forests of California for persons desiring to enter the sawmill business.

The best-timbered national forests in California are located in the Coast Range from Lake County north to the Oregon line, and southward along the Sierras from the state line to Kern County. The forests in the Sierras contain the famous sugar and yellow pine belt which produces the most valuable lumber on the Pacific Coast. The principal species in this belt are sugar pine, Western yellow (or white) pine, incense cedar, white fir, and toward the north, red fir and Douglas fir. The Coast Range species are the same with the exception that there is a much larger proportion of Douglas fir.

The following is a list of the forests:

<i>National Forest</i>	<i>Headquarters</i>
Angeles.....	Los Angeles, Cal.
California.....	Willows, Cal.
Cleveland.....	San Diego, Cal.
Eldorado.....	Placerville, Cal.
Inyo.....	Bishop, Cal.
Klamath.....	Yreka, Cal.
Lassen.....	Red Bluff, Cal.
Modoc.....	Alturas, Cal.
Mono.....	Gardnerville, Nev.
Monterey.....	Arbolado, Cal.
Plumas.....	Quincy, Cal.
Santa Barbara.....	Santa Barbara, Cal.
Sequoia.....	Hot Springs, Cal.
Shasta.....	Sisson, Cal.
Sierra.....	Northfork, Cal.
Stanislaus.....	Sonora, Cal.
Tahoe.....	Nevada City, Cal.
Trinity.....	Weaverville, Cal.

Detailed information regarding any special features of the national forests may be obtained by addressing the forest supervisor at any of the forest headquarters, or by communicating with the district forester, 114 Sansome Street, San Francisco.

“WHEN we plant a tree, we are doing what we can to make our planet a more wholesome and a happier dwelling place for those who come after us, if not for ourselves.”—*Oliver Wendell Holmes.*

The Chemical Industries of California

By John Maxon Stillman

Member of Faculty, Leland Stanford Junior University

Editor's Note: Doctor Stillman is recognized as one of the most scholarly technologists of California; also as one of the most direct and concrete in his thought and knowledge of our conditions affecting the development of technological industries. His educational services have been no less distinguished, for he has participated intimately and influentially in the upbuilding of Stanford University from the date of its foundation. Aside from these important general phases of experience Doctor Stillman's long continued participation in technical instruction and research eminently qualify him to prepare the following sketch, which so well reflects the safely progressive purposes of this publication.

IN THE development of a new country, mining, agriculture, and manufactures most closely related to the necessities of life are naturally the earliest to be developed. This is true of California. The so-called chemical industries are in general a later development. By chemical industries are meant those industries in which products are obtained as the result of chemical processes from raw materials whether of mineral or of organic origin. These processes may be of comparative simplicity and relatively slight cost, such as the refining of petroleum, or they may demand much labor and expense so that the value of the finished product is determined by the cost of the labor rather than by the cost of raw materials. Such, for example, are the Portland cement industry, sugar manufacture and especially such processes as the manufacture of organic dyes, or synthetic drugs. The conditions necessary for success in developing the chemical industries in any particular locality are availability of raw materials, labor, skilled

and unskilled, cheap fuel or power, and accessibility of markets for the product—a condition involving costs of transportation.

OBSTACLES REMOVED

In California there are many minerals and raw materials of organic origin which could form the basis of chemical industries. The chief difficulties lying in the way of their development, however, were for a long time the lack of cheap fuel or power. The comparatively recent development of the immense petroleum resources of which the annual production exceeds \$35,000,000 in value, together with the invention of practicable methods of applying its use to a great variety of furnaces and burners, removed one of the most important obstacles to the development of chemical industries in the State. The construction of great plants by which the power of water falls or torrents from the Sierras can be utilized to furnish cheap power in the form of electric current removes another important difficulty. The gradual extension of railroad sys-

tems and the improvement of waterways, and doubtless also the opening of the Panama Canal are increasing the facilities for connecting localities which may advantageously serve as sources of raw material with the necessary markets for their products.

Labor has also been in general more expensive and still is so, than in competing states or nations. Where the element of expense for labor is small as compared with machinery, fuel, water, and raw materials the difference in cost of labor may be of subordinate importance, but where much skilled and unskilled labor must of necessity enter into the cost of production, this difficulty is still a real one.

SUPPLYING LOCAL NECESSITIES

Naturally the chemical industries to be earliest developed were those supplying local necessities. As California furnished many ores of precious metals or of many other useful metals, the metallurgical processes were among the first to be introduced, at first gold, silver, and quicksilver, and later the more expensive reductions of lead, copper, and zinc. In the year 1912 the values of the production of these metals in California is given as: Gold, \$19,713,478; silver, \$1,300,136; copper, \$33,451,672; lead, \$1,144,731; zinc, \$4,345,591; mercury (in 1909), \$863,034.

The production of illuminating gas, at first from coal, always an expensive source in California, and later more cheaply from crude oil, was an early necessity, and the value of illuminating and fuel gas produced in California was estimated in 1912 at over \$11,000,000.

The need of blasting powder in mining and engineering projects gave rise to an early establishment of factories for explosives and these have increased in the volume of their product and the variety of products, so that the manufacture of explosives is an important local industry.

The making of clay products—brick, tile, and ceramics—is another industry which was of necessity early introduced and has progressed continuously—the products being valued in the last census at over \$4,500,000.

Fermentation and distilling industries—beer,

wine, and distilled liquors—are developed to an annual production of not far from \$25,000,000 in value.

The manufacture of sugar from the beet was encouraged by the costs of transportation of refined sugars from Eastern points, and the consequent relatively high price of refined sugar. At first a struggling industry, it has developed under the influence of increased facilities for transportation and irrigation, as well as under the protective tariff, until the value of its products lies between \$15,000,000 and \$20,000,000 annually.

The sugar refining industry is also an important one, two large refineries on San Francisco Bay operating on Hawaiian raw sugar, as well as on sugar from other sources.

The application of crude oil to fuel purposes has created an industry of large proportion in the manufacture of Portland cement. Twenty years ago California depended mainly upon cement from Germany or the East. At present some twelve or thirteen factories are manufacturing not far from \$8,000,000 per annum of Portland cement.

The manufacture of sulphuric, nitric, and other acids is estimated at over \$1,000,000 in value per annum.

Artificial fertilizers are manufactured to the extent of over \$2,000,000 a year.

The refining of crude petroleum was the natural outgrowth of the oil development and in the last United States census twenty-nine refineries are stated to have produced products to the extent of nearly \$18,000,000 for the census year.

The production of salt from ocean brines and its refining is carried on on the shores of San Francisco Bay and on the coast of Southern California, the annual production being in 1910 valued at \$750,000.

Of especial interest are certain chemical industries which have developed from conditions peculiar to California. Such, for instance, is the refining of borax, ores of which are found in the comparatively rainless districts of Death Valley, the basin of Owens Lake, and some other localities. Owing to difficulties of ac-

cessibility of water, fuel, and transportation to these arid regions, the costs of production were considerable but not great enough to prevent the development of a profitable business in the refining of borax.

MAKING THE DESERT PAY

These arid regions have long been known to contain enormous deposits of common salt, soda, and borax, and more recent investigations have shown also that they contain in the form of brines very considerable quantities of potash salts.

Government experts (1912) estimate the quantity of potash in Searles Lake basin in the form of saturated salt brines at from 4,000,000 to 10,000,000 tons. Owens Lake is estimated to contain almost as much.

Estimates of a private source (Mr. C. E. Dolbear), are for the Searles Lake deposit even higher, being for potash as chloride 30,000,000 tons, for borax 17,100,000, sodium carbonate 115,130,000, sodium bicarbonate 42,700,000 tons.

A serious effort is being made to render available the resources of this region; a railroad has been built and a factory is in progress. If the practical difficulties in the way of the profitable working of these brines can be overcome, it will be of great importance to this State and to the nation.

The enormous masses of sea weed or kelp in coast waters have lately been the subject of much study and speculation with a view of making them a profitable source of potash salts. It is still an unsettled question as to whether this potash content, somewhat variable, can be profitably extracted under competitive conditions.

The manufactures of paints and varnishes, of glass, soap, matches are also prominent industries already established and of importance in their contributions to the commercial and manufacturing interests of the State.

There are many possibilities for the future of chemical industries in California. There are also evidences that a realization of these possibilities is becoming more general. The financial and commercial conditions produced

by the European war have naturally operated to postpone expansion of existing industries and to discourage new ventures. At the same time the embarrassments arising from the war have brought home to the American people the dangers of relying too securely upon the resources of foreign countries, and we may look for efforts to make our industrial welfare more independent in character. The rapid extension of irrigation systems, increasing facilities for transportation, by rail and by sea, the development of cheap electric power, and the utilization of oil as a cheap fuel are all factors which are making more practicable the maintenance of industries which thus far have been left to the states east of the Rocky Mountains, but which, with a combination of business enterprise and chemical and engineering skill, can successfully be established in California. American inventive genius has usually found a way to offset, at least to a considerable extent, the higher cost of labor by labor-saving devices, and we may trust that problem will also be solved.

GREATER APPRECIATION ESSENTIAL

Two essential conditions are necessary for the upbuilding of chemical industries in California—a greater appreciation by the capitalist of the value of first-class chemical knowledge and chemical engineering skill, and a sufficient number of well trained chemists and chemical engineers who can take the initiative in pointing the way and in directing the processes toward success in new ventures. It is here that evidences exist which are most encouraging. There is manifestly a growing tendency in many of the larger industries to secure and depend upon trained experts, and there are already many able chemists at work, while our universities are contributing in no unimportant way in increasing the number of well trained chemists whose skill and ability will, in time, place the chemical industries of California and the Pacific Coast upon a basis commensurate with its natural resources and commercial capabilities. The American Chemical Society, which numbers some 7200 members, has already over 300 members in Cali-

fornia, a number exceeded only by New York, Pennsylvania, New Jersey, Illinois, Massachusetts, and Ohio.

While, of course, not all of these are capable of taking the lead in seeing the opportunities for new industries or for adapting old methods to changed conditions, yet years and experience will ultimately bring leaders to the front. That important initiative already exists is evidenced by such California enterprises and experiments as the electrolytic reduction of iron

ores at Heroult, the electrolytic separation of acid sprays, or cement dust, from flue gases by Dr. Cottrell's process, and the Thiogen process of Professor Young for the recovery of sulphur from smelter fumes. These and other ventures are symptomatic of a realization of the necessity of chemical invention and enterprise. When industrial conditions generally are more settled than at the present, we may expect a marked advance in the chemical industries of California.

California's Comprehensiveness

NOT alone is California agriculturally among the most fertile of sections, not only in the United States, but in the world, but also is it markedly comprehensive in its fertility. Where another State or another country may excel in any one product, California excels in a hundred. There is scarcely a land that has not met a competitor in California. Does the Egyptian Delta grow cotton? Do the Southern States follow suit? Then California must needs have a hand in the game—and lo! the Imperial Valley looms up as a cotton producer promising to outdo all rivals. Does far-off Smyrna grow the finest figs, or the Holy Land the choicest olives? California is there, also, and to be reckoned with. Do China and Japan, Oriental lands, produce rice that excels? Nay, they must look to their laurels, for the Sacramento Valley of California—and other localities as well—are becoming factors in the market for this precious cereal. No Klondike, no Australian gold field, can surpass California's store of the glittering metal; nor can the fabled shores of the Rhine, the valleys of the Moselle, the hills of Castile, nor yet the vineyards of Omar's fairyland, give fairer draught than the sun-kissed slopes of the rolling foothills of California. So through the whole catalogue of products: Is it any wonder that Californians regard with a pride akin to adoration the Golden State, golden not alone because through its terrestrial depths the greatest mother lode in the world twines, but because the shores are sun-kissed to golden wonder and the flowers and fruits, sun-burnished, contribute to the glory of it all.

Mineral Development of California

By Fletcher McN. Hamilton

California State Mineralogist

Editor's Note: The executive work which California undertakes for the better knowledge of her metal and mineral resources and industries is vested in a State mineralogist and an institution known as the State mining bureau in the Ferry Building, which is itself State property, in San Francisco. The State mineralogist, Mr. Hamilton, prepares for our publication a statistical and descriptive review of the resources and industries of which he holds official purview. Mining in its various forms was the foundation of California's greatness and introduced the State to the world's notice. Mr. Hamilton's account shows that mining is still a great industry and minerals a great resource of the State.

CIVILIZATION is directly dependent upon mining and the mineral products. California has the greatest store of mineral wealth of any state in the Union. This is shown by the fact that although it is a thinly populated state, having but fifteen people to the square mile, its present annual output of minerals is over \$100,000,000, and California is out-ranked by only four other states which have many times the number of people to the square mile that we have. There is ample indication that future developments will disclose mineral resources that are now scarcely thought of by the ordinary person.

The early history of California is synonymous with the early history of mining in California. The discovery and development of the marvelous gold deposits and the ease with which this golden wealth was accumulated, accounts for the rapid growth of agricultural and industrial activities. In merely three years after the important discovery of gold at Sut-

ter's mill there had been won from the earth over one hundred million dollars.

It is wonderful to relate, that, with the advancement and growth of the State of California and with the demands and necessity for the numerous mineral products used in the various arts and industries of a complex civilization, the natural resources within the confines of our State have been discovered and developed to such an extent that we can supply practically all our needs.

California today produces on a commercial basis over forty different rocks and minerals.

Mineral deposits are known in every one of our fifty-eight counties, and all but two have a commercial output.

CALIFORNIA'S GREATEST MINERAL PRODUCT

Petroleum is the mineral product which looms largest in a summary of mineral resources. During 1914 the record production of 105,000,000 barrels was attained, valued at \$49,000,000. This industry has been almost



Pennsylvania Mine, at Grass Valley, California

entirely developed within the last fifteen years. It is not confined to a monopoly as many suppose. There are some three hundred companies engaged in the production of oil which is purchased and marketed by four or five large concerns having thousands of miles of pipe lines and many tank steamers touching various Pacific ports. The future supply of oil is so large that even a conservative estimate would appear absurd; however, it should be borne in mind that when the oil is taken from the ground it is exhausted, and therefore particular consideration must be given to methods for its conservation.

Competition among producers has been so keen that more oil is produced every year than is needed and the amount going into storage is constantly increasing until we at present have almost 60,000,000 barrels stored above the ground. Lack of co-operation among producers has therefore prevented them from obtaining as large a profit as they should. However, the general public has profited to such a great extent that even electric power, generated by water falling through pipes down our steep mountain slopes into hydro-electric power stations, in many places, can not compete with power generated from oil fuel. The inferior grade and small number of coal deposits in California make our abundant supply of fuel oil of even greater importance.

With practically no co-operation producers of oil received about \$5,000,000 in dividends during 1914.

WHAT GOLD CAN STILL DO FOR CALIFORNIA

Gold is responsible for the remarkably fast development of California in that the great quantities early discovered in the State quickly drew many hardy pioneers within our borders. During 1914 over \$21,000,000 in gold was produced, this bringing the total gold production of California to well over \$1,600,000,000. Creditable estimates show that nearly as much more gold remains buried in the ancient gold-bearing gravel channels and hydraulic mines in our mountains. These gravel channels were profitably worked by the hydraulic method, but as it was claimed that the silt carried down from hydraulic mines was rapidly damaging our navigable streams and agricultural lands, legislation was enacted whereby the hydraulic mining industry was regulated to the point of strangulation. This branch of the mineral industry deserves particular attention and investigation in order that due consideration be given. Facts and plans will be presented showing that this enormous amount of metal wealth can be devoted to the use of mankind, not only without undue injury to other industries and pursuits, but can be directed to be of particular benefit to them.

The deposits of gold ore have been bounti-



A CALIFORNIA OIL GUSHER. The petroleum industry in California has been developed almost entirely within the last fifteen years and at the present time the total annual production is over 100,000,000 barrels.

This Map Shows Where the Mineral Wealth of California is Located

MR. FLETCHER McN. HAMILTON, California State Mineralogist, declares: "It is wonderful to relate that, with the advancement and growth of the State of California and with the demand and necessity for the numerous mineral products, . . . the natural resources within the confines of our

State have been discovered and developed to such an extent that we can not only supply practically all our own needs, but furnish a large surplus for consumption outside of the State as well." Those who are attracted by this phase of California's productiveness may become informed of any detail through our READERS' SERVICE, whose experts are able and ready to answer all queries.

There are opportunities today, as in the past, for those who are interested in mining, etc.



PANAMA CANAL has opened the world to California as a market for its products, and with the restoration of normal conditions in Europe the demand for mineral supplies will be enormous. California is in a position to meet this demand as well as care for domestic requirements.

fully distributed by nature and our present production comes from not less than thirty-two counties, a little over one-half being taken from deep mines, and the remainder from placer deposits, chiefly won through dredging operations. During the past year considerable development work has taken place upon old properties which had been idle for many years, and in many cases this resumption of work has already resulted in profit, and proven the persistence of our great ore bearing zones. As gold is a product that is always marketable, the conditions resultant from the European war will undoubtedly stimulate this work on old deposits, and many opportunities await only intelligent development in order to be placed among our best producers.

CEMENT

Nearly every constructive work of civilization now depends upon the use of cement, of which California produces annually some \$7,000,000 worth from seven separate plants which afford employment to over three thousand men.

As with our other mineral resources, those making up cement are widely distributed over the State. Another striking instance of the fact that we are only beginning to develop in a mineral way is that this enormous industry has been developed almost entirely within the last twenty-five years. A further increase of

this industry is only limited by the needs of the territory commercially tributary to the Pacific slope. Many undeveloped deposits of lime and limestone exist within the State.

THE SERVICE OF COPPER

Electricity, which has become such an important factor in our every-day life, would be comparatively worthless if it were not for the availability of copper from which a large portion of transmission lines are constructed, and electrical machinery made. Not less than seventeen counties annually contribute to our copper output and there are over sixty producing concerns. During 1914 there were produced about \$3,500,000 worth of copper, and only the interruption of the foreign war prevented this figure from equaling that of 1913 which was over \$5,000,000. It is almost unnecessary to call attention to the fact that this metal, like so many of our other mineral resources, is also widely distributed over the State and controlled by no monopolistic concerns.

The exploitation and development of our copper resources has been considerably handicapped in recent years by the activities of the so-called "smoke farmers" against the copper smelters. There is no doubt but that in the past, when no effort was made to control the smelter fumes, great damage was done. But since the regulation and control of these fumes



Gwin Mine, Paloma, Calaveras County



Butte Mine, Jenny Lind, California

have been required and carried out there seems to have been no material damage inflicted, and it is to be hoped that in the light of an exhaustive investigation and report by an arbitration commission appointed in the case of Solano County against the Selby smelter, which was favorable to the smelter (as well as a recent decision in favor of the Mammoth Mining and Smelting Company, located at Kennett, Shasta County, against some of the farming interests in which the judge gave a very favorable decision to the company which will in all likelihood prevent further curtailment of smelting operations in that section),

that there will be engendered a feeling of community spirit between the smelters and farmers. When such feeling is applied to all the rest of such problems, the State of California will profit immeasurably thereby.

WHAT CALIFORNIA CAN DO FOR THE COUNTRY IN MINERALS

Because of the economic conditions brought about through the European war and the probability of the United States being forced to rely upon its own mineral resources, and because this country is a potential producer of almost every mineral substance used in the industrial world, the possibilities of future de-



Mill at Plymouth Mines, Amador County



Head-frame, Plymouth Mines

velopment can be foreseen. A brief review of the subject reveals the fact that in several instances California is the sole source of domestic supply, and with but few exceptions this State contains deposits of every mineral produced elsewhere in the United States.

Seventy-five per cent of the quicksilver produced in the United States comes from California. One of the important uses of quicksilver is in the manufacture of fulminate for explosive caps. Another important use is in various electrical equipment. The war caused a very rapid rise in the price of this com-

modity which stimulated activity during the latter part of 1914, and the total production will be valued at about \$750,000. There are over twenty producing mines scattered through eight counties. Innumerable undeveloped prospects are known to exist.

Magnesite is a mineral which affords considerable opportunity for future development. Reports of actual production have been received from twenty-four different properties located in four counties. One of the uses which has caused it to be particularly noticed recently is in building operations. It is used



Head-frame, Fremont Mine, Amador County



Raymond Granite Company Quarries, Knowles, California

in making plastic material for flooring, tiling, wainscoting, artificial marble, paint, and fire-proofing. Some notable examples of the use of this mineral will be seen at the Panama-Pacific exposition, where some 5000 square feet of magnesite flooring is in use. It is curious to note that although California is the only State in the Union which has produced magnesite, and although there are many large deposits of it here, there have been considerable imports of foreign magnesite landed at our very doors. It is inconceivable that such a condition can long prevail.

Chromic iron ore is another mineral widely

distributed over California, being produced in a small way in four different counties. Since the completion of the Panama Canal there is no reason why this industry should not increase considerably. Some of the extensive uses of this material are for refractory furnace linings in steel and allied industries. It is also used as an alloy in making high-grade steels. The interruption of trade by the European war has served to stimulate an investigation along this line, and the advantage of cheap freight through the Panama Canal will undoubtedly tend to overcome the previous tendency of American users to depend upon Rhodesia and New Caledonia for our supply.

Tungsten is another mineral used largely in the steel industry and also as a filament in electric light bulbs. The industry has rapidly grown since its inception in 1905 until the normal production is at present worth about \$250,000. There is reason to expect that this industry will also expand.

Iron ore has played so prominent a part in all of the other states that exceed California in mineral output that it is reasonable to inquire as to our iron resources. There are large amounts of iron ore in California, but in the past the reduction of such ores has always



The Bank of California, San Francisco (built of Raymond granite)

depended upon a cheap supply of coking coal. However, with our great supply of petroleum and the experiments that are being carried on with electric smelting, it would indeed be a bold prophecy to make a statement that our iron resources will never be of importance to California.

Building stones of many varieties are found distributed throughout the State in sufficient quantities to meet any need that can be well imagined, and many buildings throughout the State already serve as testimonials of its utility. Sandstone alone is annually produced to a value of about \$100,000. Granite is produced from nearly twenty counties, the annual production being worth about \$500,000. San Francisco itself shows in many of its finest buildings the use of California building stones, especially the sandstones and granites, as well as artificial stone, brick, and tile, manufactured from our large clay resources.

Asbestos is a mineral that is commonly known to every one and occurs in many localities in California. However, the production of asbestos has never been important in the past and the United States has depended almost entirely upon the Canadian deposits. New

uses are being found for asbestos, particularly in building operations, as it has been discovered that asbestos wall plaster renders the wall impervious to heat and also does away with the echo, which is undesirable in many buildings. The asbestos pulp has been mixed with cement and magnesite for roofing and flooring with very satisfactory results. There is no doubt but that this industry can be expanded by the proper application of energy.

Clay deposits are at present worked in four-teen different counties of the State. With our fuel oil supply and with the growing population and industrial development of California, it is only a matter of time until the pottery and clay products industry will be of much greater magnitude. Even at the present time we have a considerable number of potteries and brick manufacturing plants from one end of the State to the other. But the new uses to which such products are being put, and even the new products themselves, assure a much larger growth of this important mineral branch.

Potash is a mineral which has become of national and even international importance. Up to the present time the principal supply



Scene at Raymond Quarries

CALIFORNIA today produces on a commercial basis over forty different kinds of rock material and mineral products. The production is widespread over the State, all but two counties participating therein.

Annual Mineral Yield of California

The following table shows the annual yield of the mineral products in the State of California for the year 1913, compiled from returns received by the state mining bureau, being the latest complete annual data at this date:

<i>Substance</i>	<i>Amount</i>	<i>Value</i>
Asbestos	47 tons	\$ 1,175
Asphalt		2,752,000
Barytes	1,600 tons	3,680
Bituminous rock	37,541 tons	78,479
Borax	58,051 tons	1,491,530
Brick	358,754 M	2,915,350
Cement	6,167,806 bbls.	7,743,024
Chromite	1,180 tons	12,700
Clay	231,179 tons	261,273
Coal	25,198 tons	85,809
Copper	34,471,118 lbs.	5,343,023
Feldspar	2,129 tons	7,850
Fuller's earth	460 tons	3,700
Gems		13,740
Gold		20,406,958
Graphite	2,500 lbs.	25
Gypsum	47,100 tons	135,050
Infusorial earth	8,645 tons	35,968
Iron ore	2,343 tons	4,485
Lead	3,640,951 lbs.	160,202
Lime	613,444 bbls.	528,547
Limestone	301,918 tons	274,455
Magnesite	9,632 tons	77,056
Marble	41,654 cu. ft.	113,282
Mineral paint	303 tons	1,780
Mineral water	2,350,792 gals.	599,748
Natural gas	14,210,836 M cu. ft.	1,053,292
Petroleum	98,494,532 bbls.	48,578,014
Platinum	368 oz.	17,738
Pumice		4,500
Pyrites	79,000 tons	218,537
Quartz rock	4,040 tons	7,756
Quicksilver	15,661 flasks	630,042
Salt	204,407 tons	462,681
Sand, glass	14,578 tons	14,143
Sandstone	62,227 cu. ft.	27,870
Silver		832,553
Soapstone	1,350 tons	6,150
Soda	1,861 tons	24,936
Stone industry*		6,168,020
Tungsten ore	7,592 tons	234,673
Zinc	1,157,947 lbs.	64,845

Total

\$101,396,639

*Including granite, macadam, rubble, paving blocks, sand, and gravel.

Bulletin 68, giving the complete mineral statistics for 1913, will be furnished upon request.

has come from Germany, where the government has maintained monopolistic conditions in order that their natural resources should not be depleted at a loss to its own citizens and a gain to foreign countries. During the past few years prospecting has been done by our federal government in search of potash deposits which might obviate the necessity of depending upon foreign countries for this very important fertilizer. California now bids fair to become an important producer of potash, there having been erected a large plant at Searles Lake in San Bernardino County. This so-called lake is similar to many of the other playa of the desert portion of America.

In the desert regions the natural depressions frequently have no outlet and as the minerals of the surrounding hills have been worn down by erosion or slowly dissolved out by the occasional rainfall, the water carries such soluble minerals to the lake bed. The water soon evaporates and finally we have the concentration of various salts.

Another of the desert saline products is borax which, unlike potash, has already been well developed and our annual production is worth about \$1,500,000. California is the only state in the Union producing borax. Our deposits supply various foreign countries, and offer another striking illustration of the possibilities of mineral development in California.

It has been recently brought home with great force to the American people that we have an inadequate supply of chemical manufacturing plants. Many persons have recently found that since the German supply has been cut off, common articles, involving chemical products, have raised greatly in price or are not to be obtained. This knowledge will be a distinct gain to America, and particularly to California, where we have nearly, if not all, of the raw materials necessary for chemical manufacture, and application of capital and close research may be expected to place California in an enviable position as a chemical producer.

A crude start in the chemical industry has

already been made, and one of the products is sulphuric acid, the pyrites from which it is made alone being annually valued at about \$250,000.

Even when it comes to mineral waters California stands forth pre-eminently. The waters with all their beneficial and medicinal qualities are here, and the possibilities of making California world famous for her mineral springs can not be exaggerated.

The foregoing gives briefly some idea of the magnitude of the mineral industry in this State.

With the conditions of the import business affected as they are by the war in Europe, with the Eastern markets opened by the Panama Canal, and with many of the natural resources at hand ready to be used, there does not seem to be any reasonable doubt as to the possibilities of growth in this great basic industry.

A STATE MINERAL MUSEUM

The state mining bureau, located on the third floor of the Ferry Building, San Francisco, is supported by biennial appropriations from the legislature and aims to foster development of the mineral resources of the State. The results of its investigations are at the service of the public. A museum containing some 20,000 mineral specimens is constantly open to the public and visited by thousands of interested persons. There is a library containing some 5000 volumes of selected works dealing with the mineral industry. There is a laboratory where rock specimens are identified free of charge, and such information as can readily be had is given to any person sending or bringing samples. The statistical department annually sends out requests to all owners of mineral properties and issues an annual report which is distributed free of charge, fully enumerating our mineral productions. A corps of trained engineers has been employed in the past two years in reporting upon the mines and mineral resources of the State, which reports will be available to those interested in the mineral development of the State.



Panoramic view of New Idria, plant and town,

IT IS wonderful to relate that, with the advancement and growth of the State of California and with the demand and necessity for the numerous mineral products used in the various arts and industries of a complex civilization, the natural resources within the confines of our State have been discovered and developed to such an extent that we can not only supply practically all our own needs, but furnish a large surplus for consumption outside of the State as well.



Source of supply of Raymond Gra



o County, California. An early morning view

DEPOSITS of gold ore and placer gold in California have been bountifully scattered by Nature and our present annual production of over \$21,000,000 comes from not less than thirty-two counties. Gold being a product that is always marketable, the conditions resultant from the European war will undoubtedly stimulate development of our gold resource, and many opportunities await the intelligent investment of capital.



pany—Quarry scene at Knowles, California



Oil-pull tractor with Hansmann hitch pulling five double disc harrows. This photograph also gives a good idea of the soil conditions in a California valley

Relations of California Soils to Permanent Fertility

By Dr. C. B. Lipman

Professor of Soil Chemistry and Bacteriology, University of California

Editor's Note: Doctor Lipman, who is the leading soil investigator of California now in active service, interprets into clear, popular terms the results of investigations which have been pursued in this State during the last forty years, and discusses their relations to the fundamental principles of soil fertility as discerned by modern soil science and demonstrated by the most successful agricultural practice. He enables the general reader to understand why our deep soils are inherently fertile and proceeds to a demonstration of the basis for their proper management from all points of view. His article is distinctly a notable contribution to future prosperity of California agriculture.

AS THE source of the raw materials of food, clothing and shelter for the world the soil occupies a position of unique importance to man and animal, which, if comparisons were not odious, would place it paramount to all other interests of mankind. While, however, the conservation of all the soil's resources has received but scant attention, the significance thereof is much more fully appreciated and comprehended than its nature, variation and mode of functioning as such indispensable factor in our existence. Assuming therefore that my readers are fully aware of the overwhelming importance of the soil to the material welfare—if nothing more—of the human family, I shall not go into a discussion of the economic phases of the subject, but shall confine myself to some interesting discussion with reference to the nature of soils, particularly of California soils. I shall attempt, moreover, to bring out as popularly and as clearly as I can how a soil's nature, in the broader sense of that term, is related to the kind and quantity of crops which it can

produce and other factors concerned with the production of a fertile soil or with the maintenance of such.

THE TEXTURE AND STRUCTURE OF SOILS

As may appear obvious, the soil is not a solid mass of rock particles, but one in which the spaces about the particles are of considerable size. This total pore-space, as it is called, will vary from 40 per cent in the coarser sands to 60 per cent in the finest silts and clays. In other words on the average every acre foot of soil in depth is only one-half solid material, the balance being empty space. For optimum conditions with respect to the plant's air and moisture supply, half of such open space should be filled with water and half with air. The air and water supply of soils is therefore in considerable degree regulated by the "texture of the soil," as it is called, and by which we mean the mechanical composition thereof. This mechanical composition is determined by separating a soil into the various amounts of each of its component sizes of soil grains. It must be remarked here, however,

that another factor besides pore-space and even more markedly than the latter, regulates the water supply. This factor is the total surface of the soil particles within the soil. While pore-space, as we have seen, varies relatively little between the coarsest and the finest soils, the surface is enormously different between them. Water is not only spread over the surfaces of these particles, but a larger surface means usually a greater retention of water, and since water serves to dissolve off the minerals from the surfaces of soil particles and yields them as food to the roots of plants, we can readily see the important relationship of the internal surface of a soil to its fertility.

In this connection we are brought to consider soil structure as distinguished from soil texture. By the latter we mean the coarseness or fineness of a soil or the proportions of sands, silts and clay which it contains. By structure we mean the kind of aggregate particles built up in a soil from these single particles through the cementing action of organic matter, various salts, frost, changes in temperature, tillage, action of roots of plants, action of bacteria, lower animals, etc. These more or less loosely cemented soil particle aggregates determine the structure of a soil and modify very materially its total surface, and hence its water holding power, air holding power, and available laboratory space, as it were, for the manufacture of soluble plant foods. These ideas with reference to soil texture and structure must be borne in mind when the discussion below given is considered. There are perhaps but few people who realize how enormous the internal surface of soils is and for that reason it is hard for the uninformed to realize what a profound role is played by it in the economy of plant nutrition. It may be said that in an acre of soil to a depth of four feet the total surface may vary from 40 to 50 square miles in the coarse sands to about 300 or more square miles in the finest clay loams and clays.

One of the prime objects in soil management should be to make such skillful use of

tillage, liming, draining and the introduction of organic matter as will insure an ideal condition for the formation of aggregates of soil particles known as compound particles, or in other words, to make certain of proper soil structure.

THE SOIL AS A MEDIUM OF PLANT GROWTH

The soil attains its greatest measure of usefulness when it permits the largest and most healthful development of the roots of plants. It is therefore of value in agriculture in such measure as it approaches the ideal condition as a medium for plant, or more specifically, of root growth. In other words, the development of the above ground parts of plants merely mirrors the development of their below ground parts—the roots. That being the case, and the investigations of many men in many places will bear out this assertion, it follows that one can only succeed in making the soil function successfully as a producer of plant growth by providing therein, as nearly as may be, the conditions which are congenial to a wide ramification of roots. It becomes logical therefore to inquire what are such congenial conditions for root development.

To answer that query it is necessary first to understand that there are certain indispensable requirements for plant growth, including roots and tops. These are air, moisture, plant food, heat and light. The first four are common to both roots and tops. The last named is necessary for the tops of plants only and, since it perforce accompanies the supply of heat which comes principally from radiation from the sun, we shall give it such consideration as it needs under the head of heat. We may now, to advantage, give to each of these prime necessities for plant growth more detailed attention.

The Air Supply—Plants are no exception to the general rule that living things, from the simplest to the complex, must have a sufficient supply of air in order to carry on their normal functions. While this general idea is pretty thoroughly understood by the layman, there is at least one phase thereof which the average individual does not in the slightest appreciate.

I refer to the absolute necessity of oxygen for the roots as well as for the tops of plants. While in the case of aquatic plants such oxygen is necessary only in small quantity and in the case of others in large quantity, it is none the less indispensable. Space will not permit my fuller discussion of the evidence adduced by investigators to prove the close relationship between air supply for the roots of plants and the well being of the latter. I need but refer the reader to the splendid contributions of soil physicists on this point as typified by that part of King's "Physics of Agriculture," which deals with that subject. Suffice it to say here that it has been demonstrated beyond peradventure of a doubt that, other things being equal, the growth of plants in soils is a function of the air supply for their roots. If the reader will bear this point in mind he will the more readily grasp the cogency of statements made below anent California soils and their productiveness.

The Moisture Supply—That water is an essential material to plant growth becomes at once obvious when one considers: First, that seldom less than three-fourths of the weight of plants consists of that simple chemical compound of hydrogen and oxygen. Second, that water is the vehicle by which available plant food is carried up to the plant factory—the leaves. Third, that water is necessary to the life and well being of plants and to the purely chemical as well as biochemical changes which must occur in soils if plants' roots are to be supplied with so-called available or usable plant food.

The Heat and Light Supply—The heat and light necessary to plant growth are, of course, almost entirely received from the radiant energy of the sun. The absolute dependence of plants on heat is well illustrated by the fact that but very few seeds will germinate at the freezing temperature, that the earliest crops are produced on the driest and hence the warmest soils and that the most luxuriant plant growth is obtained in the tropics and other regions of high temperatures on the earth's surface. The reasons for such dependence of plants on heat are very well known

and can be summed up as follows: First, the activity of the individual cells of which plants are composed is dependent upon a certain degree of temperature for the accomplishment of chemical and biochemical reactions by them which are essential to life. Second, chemical reactions are doubled in rate with every rise of 50 deg. F., thus hastening the transformation in the soil of insoluble to soluble plant food materials. Third, the bacterial activity in the soil, which is responsible for some of the chemical reactions by which plant foods are made soluble from insoluble, must have enough warmth in order to activate. For example, the best work of nitrate-producing bacteria takes place at a temperature of about 86 deg. F.

Light is necessary only for the tops of plants, but is there absolutely indispensable since the green coloring matter of the plant leaves known as chlorophyll, which is the agent in the manufacture of sugars and starches from carbonic acid gas from the air and water from the soil, can not work in the absence of light. The latter furnishes the energy for that most interesting and still mysterious process.

The Plant Food Supply—We have now known for over a century that of the eighty odd chemical elements known there are but ten which are essential to the life of plants. They are carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur, potassium, magnesium, calcium and iron. The first three are obtained from the air and from water, and if the latter is properly supplied and conserved plants will not suffer for the want of those elements. The other seven essential elements are obtained by the roots of plants from the chemical compounds in solution in the soil water. One of them, nitrogen, may be obtained from the air by certain classes of plants—the legumes, including clovers, alfalfa, vetch, peas, beans, etc.—through assistance rendered by a class of bacteria which lives in little nodules on their roots. The chemical compounds otherwise referred to as being in the soil water are derived by weathering of the minerals of which soils are largely composed and which, of course, are in turn derived from the rocks

from which they were originally split off. When soils are formed from a few minerals like quartz, which contain very little if any of the essential elements above named, the latter must be added in some form commonly known as fertilizers.

CALIFORNIA SOILS IN THE LIGHT OF THE FOREGOING

From the principles above enunciated it follows that soils must of necessity show great variations with reference to their supply of air, moisture, heat and plant food not only under any given set of climatic conditions, but more particularly under different climatic conditions. Thus in a region of much rainfall, in which clay forms more rapidly, we should expect a predominating number of clay soils with excessive water-holding power, especially in the subsoil into which much of the clay is beaten by heavy rains. But if that is so they must of necessity have a more limited air supply. Also when soils hold much water they use up so much heat in the evaporation of water that the soil only with difficulty attains the degree of temperature optimum for plants. Then too in soils with much clay and much water, roots can not develop widely and deeply for reasons explained above, or in other words, their foraging surface is decreased. Finally in a region of much rainfall much better opportunities for the leaching out of plant food are available and particularly of that fraction of the plant food known as the supply of available plant food, which is the only portion that plants' roots can assimilate.

Conversely, it follows that in the other extreme of climate or, in other words, in the arid as contradistinguished from the humid region, the drawback above pointed out must largely disappear and be replaced by as many advantages. Thus in California, which belongs in the arid region of small rainfall in a limited season, clay forms more slowly. Soils here are thus predominantly of the lighter or sandier variety. It follows from that, that air must penetrate into them with greater facility and to a greater depth; also that excessive amounts of water will more readily drain away. But these are congenial conditions for

a large and deep root development. Therefore roots must have a much larger area of soil surface from which to obtain the great necessities to their existence above enumerated. The climate of the arid region insures to plants, moreover, similar advantages with regard to heat and plant food. For the larger number of days of sunshine, which we have along with the warmer sun in summer, and the very mild winter temperatures operate to maintain a much greater amount of heat in our soils. Likewise in the absence of excessive and continuous rainfall, there must occur the minimum leaching effect and hence arid soils, to which ours belong, must contain far more of the elements found in soils which are essential to plant growth.

THE DEPTH OF CALIFORNIA SOILS AND ITS SIGNIFICANCE

Briefly, therefore, the climatic conditions peculiar to the arid region have made possible the formation in California of soils popularly spoken of as deep, well aerated, and rich or well supplied with plant food. Their depth, moreover, is at once the most characteristic and most valuable asset of California soils. For greater depth means, popularly speaking, greater foraging surface. From what has been said above it stands to reason that a plant root which covers two hundred soil particles and therefore has available to it all the plant food carried in the water films which invest them, must have twice the chances for a successful and vigorous growth that are possessed by a similar plant whose root system has only available for its spread one hundred soil particles of the same kind. A proper understanding of this simple fact renders easy the explanation of the celebrated fertility and durability of arid soils. It is the key, moreover, and this is very important, to the development of systems of soil management in California which, so far from reducing the wonderful intrinsic fertility of our soils, will render possible the enhancement thereof.

We therefore have the advantage of not only much more of the important plant food elements in an acre foot of California soils than exists in an acre foot of an Eastern soil

because of lack of leaching here, but for every acre three feet in depth offered the roots of plants by Eastern or humid soils, our soils offer at least six feet in depth of such available and congenial soil surface. In many of our soils these depths are much greater.

A little reflection will make it obvious that the logical outcome of such a condition as that above described for California soils, is that they will last longer not only because they have been leached less but because the roots of plants have so much more soil surface to draw upon for their food. Fertilizers need therefore to be used sparingly, if at all, on many of our soils, thus making the cost of maintaining a fertile soil a much smaller one in California than in Eastern states or other humid regions. California soils contain, on the average, ten times as much lime as Eastern soils, about three times as much potash and about the same quantity of phosphoric acid. This is true when equal weights or volumes of soils from the two regions are compared. If we assume that our soils have only twice the amount of surface (they have much more) suitable for root development possessed by Eastern soils, then there is on the average, available for the use of plants, twenty times as much lime in the soils of California as in the Eastern states, six times as much potash, and twice as much phosphoric acid. The condition with respect to nitrogen is that in reality most California soils are poorer than Eastern soils in that important element, weight for weight, or volume for volume, but here again depth and extent of soil surface enter into the subject and owing to the greater depth of our soils considerably more nitrogen is available for the uses of plants than in Eastern soils, taking averages for consideration.

THE ONE GREAT DEFICIENCY IN CALIFORNIA SOILS

The one great deficiency in all the arid soils of California, such particularly as those of our interior valleys, is organic matter. The latter is the characteristic component of agricultural soils and distinguishes them from masses of disintegrated rock particles. It is a material

which maintains a good structure in soils in accordance with principles above explained; it is the chief source of carbonic acid gas, which dissolved in the soil water helps to change insoluble to soluble plant food materials; it is the source of nitrogen for most crops; it furnishes carbon and other materials as sources of energy for soil bacteria of various kinds which are essential to the maintenance of an available plant food supply.

Many methods may be employed to make good this deficiency in California soils. Barnyard manure should be used to plow under as the first choice, whenever it is available. The next method should be the deep incorporation through plowing of green manure crops or cover crops. In the southern part of California the vetches serve best for this purpose. In other parts of California burr clover or Canada field peas may be used, or one of these mixed with grain like barley, oats, wheat or rye. When none of the legumes can be employed a cover crop of the grains alone will assist. When none of these methods is practicable, well rotted bean straw or spoiled alfalfa hay, preferably, or other forms of straw and weeds, both green and dry, should be mixed with a small quantity of stable manure and thoroughly packed and moistened. This will make a large mass of well-rotted organic matter which is excellent for incorporation with the soil. In valleys with a very long, hot summer, organic matter of some kind should be placed on the surface of the ground, especially in orchards, to keep the soil cool and moist. This will prevent rapid oxidation or "burning out" of the organic matter. This operation, which is called "mulching," can be carried out about May 15 or June 1 and cultivation discontinued for the balance of the summer.

IRRIGATION AND DRAINAGE OF CALIFORNIA SOILS

It is manifestly impossible to discuss with any degree of detail this important subject in the brief space allotted me, but some serious abuses in our irrigation practice render a proper comprehension of the subject of the greatest practical moment. I venture there-

fore to speak of these important points briefly. In a word, the greatest evil about California irrigation, probably also about irrigation elsewhere, is an unnecessarily extravagant use of water. Viewed merely from the point of rural economy the practice is a reprehensible one, but considered from the standpoint of soil fertility and its maintenance, it is little short of criminal. Excessive use of water militates against proper temperature conditions in the soil and prevents the supply of air from being normal. The cogency of these two objections is attested by the considerations hereinabove discussed, but the most important objections have still to be mentioned. Excessive use of irrigation water raises the water table, thus making worthless large surfaces of soil particles which should serve as sources of food and water for the roots of plants. Moreover, the rise of the water table is always accompanied by the improvement in the power of capillarity in a given soil to raise water to the surface. In arid regions which, as above explained, are supplied with large quantities of soluble salts from the rapid weathering of soil minerals there, such rapid movement of water upwards will transport to and concentrate at the surface large quantities of these soluble salts and as the water evaporates it leaves there the salt accumulations that are responsible for injury to crops on alkali lands. It would appear that such irrigation is carried out on the basis of the popular maxim that "if a little water is good more is better" and that water can make up for lack of tillage and other methods of maintaining soil fertility. People do not sufficiently realize that a small amount of water properly conserved in soils can produce paying crops and preclude the danger lurking in the excessive use of water of destroying the soil's fertility. Constant summer cultivation, as nearly as possible once a week, or mulching as above explained, in orchards and vineyards, will make possible such excellent conservation of moisture that only one or two irrigations in a summer will supply all the needs of the crop even in a region of very deficient rainfall like the San Joaquin Valley.

Another common misconception with respect to the soils of California is that drainage is unnecessary because there is so little rainfall. As a matter of fact, drainage is frequently necessary even on lands receiving no irrigation and certainly will be needed on flat areas of land with a slight slope and poor outlet, if damage from a rapidly rising water table and its concomitant evils is to be averted. All who are interested in the maintenance of the wonderful fertility of California soils should therefore keep prominently before them the vital necessity of preventing excessive use of water in irrigation and of providing drainage wherever called for.

THE ADAPTABILITY OF SOILS TO CROPS

The writer entertains a genuine fear that this subject is one which is more hopelessly muddled in the lay mind than any other touching agriculture. Indeed he has good reason to fear that the professional agriculturist even is often in a state of abysmal ignorance with reference to the facts in the case.

Two misconceptions seem to be characteristic of the uninformed. First, that a chemical analysis of a soil will reveal its adaptability to crops. Secondly, that secular selection of plants by natural means has progressed so far as to render necessary a most careful selection of a soil for any given crop either according to mechanical or chemical standards of judging soils.

While indeed there is no reliable evidence that some truth may not attend these conceptions and that very profound and extended study may prove them in part justified, we are obliged as scientific men to regard these ideas in the light of present knowledge as being, if not in their entirety, at least largely, chimerical. As a matter of fact, practical experience, which gives us the only reliable data on the subject, thus far teaches that almost any crop may be made profitable on almost any soil, abnormal conditions below discussed being barred, of course. Nothing can be more patent in this regard than the fact that alfalfa is being grown successfully on every type of soil in the State of California and we are not without our just quota of such types. Citrus trees are

produced successfully on the lightest and on the heaviest soils and on all intermediate types. Vines are grown successfully on shifting sands and on the heaviest black adobes. Barley and wheat do not seem to show clearly marked preferences. Even such crops as peaches and almonds are grown successfully on a very wide variety of soil types despite the prevalent idea that they will only do well on our light soils. We might in this manner run through the whole gamut of California crops and still be unable to discover in practical results indications of a specific adaptability of soils to crops.

To be sure some soils will produce more fruit of a given type than others, but that is not connected at all with the question of adaptability, but merely with a difference in power to supply the essentials for plant growth which are above named. This power can be very much modified, as shown in this paper, and what is more important, the difference will affect any crop and not only a specific crop. Our ideas with reference to this subject have about as much foundation in fact as those other ideas which are just as prevalent with respect to the specific effect of the essential plant food elements in fertilizers. There is no more justification, thus far, for believing in the specific adaptability of a soil for a crop than there is for the belief that potash makes a thin and smooth rind on an orange or other fruit, that lime makes a sweeter fruit, and that phosphoric acid increases coloring of fruit.

ABNORMAL SOIL CONDITIONS

There are several abnormal conditions to be met with in arid soils like those of California which are common enough to justify special mention here. They are particularly hardpan and alkali conditions.

Hardpan—A hardpan is an impervious and refractory layer of soil which is rarely penetrated by roots, water or air. It occurs anywhere from the surface of the soil to any depth several feet below, and it varies in thickness from a fraction of an inch to many feet. Depending upon the kind of minerals present in the soil in which it is formed, hardpan will vary widely in nature. We may thus

have produced by the cementing action of chemicals and pressure of the surface soil a rock-like mass partaking of the nature of the soil material above but very hard and impervious. Sometimes therefore there may be sandstone hardpans and at other times lime hardpans, iron hardpans, gravel hardpans and black alkali hardpans. The damage done by such hardpan layers is of course increasing the damage to plants by preventing free flow of excess water downward, by decreasing the available surface for root development, and by making possible a faster rise of the water table than ordinary on irrigated land and with it the rise and concentration of the alkali.

Ameliorative measures against hardpan consist of blasting, principally. Blasting with dynamite is most effective only if hardpan does not exceed several inches to one foot in thickness and if it can be done in every tree hole in the case of orchards to make possible better and wider root penetration as well as drainage of excess irrigation water. Where hardpans are more than several inches in thickness only very careful and economical use of water and thorough tillage and heavy manuring can put off the day of trouble for crops. Even such methods will only be successful on lands with at least $2\frac{1}{2}$ to 3 feet of good soil over the hardpan.

Alkali—By the term "alkali" we mean an accumulation of soluble salts. These are derived in most California soils, as implied in the discussion above, from a weathering of soil minerals which renders possible the formation of soluble salts and the subsequent transportation upward of such salts by rise of capillary waters carrying them in solution. As the water evaporates when it arrives at the surface the salts remain behind and the soluble salt accumulations of several feet in depth are thus concentrated at the surface. Thus while they were harmless or even beneficial as diffused in several feet of soil they are rendered injurious through concentration. Usually these salts are common salt (sodium chloride), Glauber salt (sodium sulphate) and sodium carbonate (salsoda). Any or all of these may be present in alkali lands. The first two are

usually denominated collectively "white alkali" and the last named is known as "black alkali" because of its power to dissolve organic matter from the soil and produce black spots at the surface. Gypsum occurs with these alkali salts not infrequently and sometimes also magnesium chloride, and magnesium sulphate. The damage done by alkali salts is through corrosion and poisoning of the plant tissue and by preventing proper water absorption by the roots of plants. They also destroy good structure in soils and make the latter impervious to air and water.

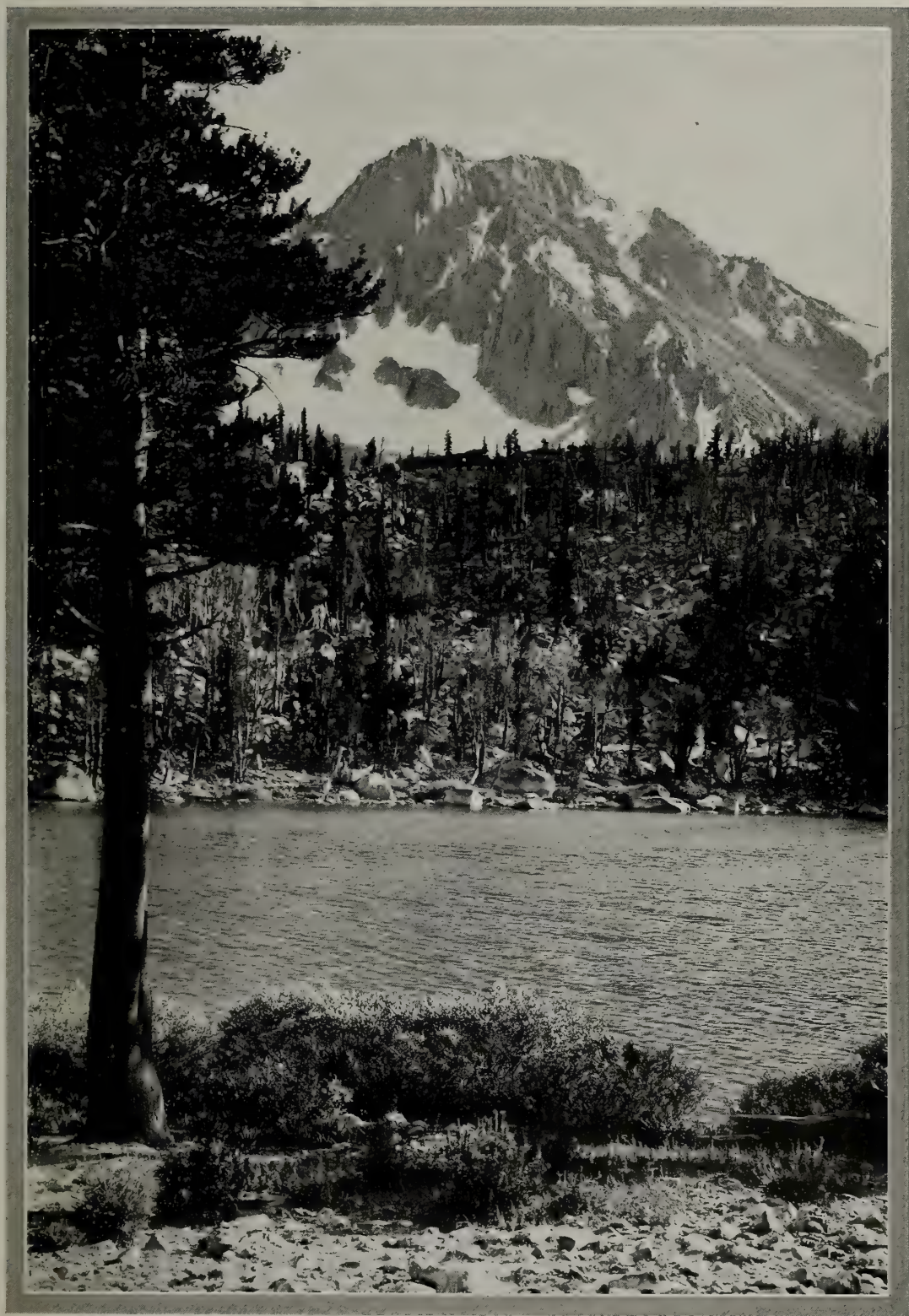
As the reader may readily surmise, the usefulness of alkali lands in practice must depend not only upon the total quantity and nature of its components but also upon the type of soil in which they are found. In general, it may be said that the results of modern research make it appear highly probable that we shall take a much more hopeful view of alkali reclamation in the future than we have in the past. Not only such feasible, but expensive, methods as flooding and tile drainage to carry the salts away will be largely employed, but also the introduction of organic matter and direct chemical treatment to prevent the detrimental activity of the alkali salts will doubtless soon be resorted to. It seems safe to assert that the next decade will see the reclamation

and profitable use of enormous areas of land now referred to as barren alkali land by the use of methods above referred to.

CONCLUDING REMARKS

In the discussion of outstanding general principles and of particular conditions in their application to California soils the writer hopes that he has made the most economical use of the brief space allotted him. If the reader will have learned from my remarks that the most valuable asset of California soils, when viewed by and large, is their depth, he will have grasped the essential truth about them. Moreover, a proper understanding thereof explains the inherent fertility of our deep soils and gives a reasonable and logical basis for their management from all points of view. It is also hoped that the reader will catch from the foregoing paragraphs some of the author's enthusiasm for the fascination of a subject which deals with a study of a most wonderful medium for plant growth in which there operate profound laws of physics and chemistry and which is at the same time a home and laboratory for hosts of living organisms. All of these forces are constantly activating to make the soil a more congenial and richer medium for plant growth, if we will only make it possible for them to operate normally.

"BACK to the soil" may be applied literally as well as figuratively in the case of the man who intends to seek his means of living in the fields. California is adapted as are few other States to the needs of every class of farmer, no matter how great or how small his enterprise. Accurate information regarding the soil of any particular portion of the State will be cheerfully furnished readers of this publication if they will write the Service Department. The information supplied will be obtained from soil experts, who know all about the conditions and requirements.



University Peak, near Kearsarge Pass, near Kings River Canyon, California. A picturesque view of high altitudes in one of the most beautiful sections of the State

The Climate of California

By William G. Reed

Instructor in Climatology at the University of California

Editor's Note: Mr. Reed gives accurate data on the climates of California and contrasts them with the climates of other older-settled regions of the world, thus rendering the differences clear and readily intelligible. He also interprets the significance of these differences to human industry and comfort. California is discussed in its various climatic subdivisions, and the ruling characteristics of each are noted. The statement is brief, striking, and will lead to a better understanding of California even by Californians. To distant readers, the records and descriptions are illuminating.

GENERAL FEATURES—The California climate is of the type known as Mediterranean because in its essential features it closely resembles that of this famous region. This is because the conditions controlling the climates of the two regions are the same. Climates similar in their main features are also to be found in Central Chile, in South-western Australia, and in New Zealand. The characteristic features of the Mediterranean or Californian climate are the generally mild temperatures—and this is in spite of the fact that in certain portions of the State the thermometer reads higher than anywhere else in the country—the dry, or nearly dry summers, and the occurrence of winter rains.

But the statement that California has the same general climatic features as the Mediterranean lands does not tell the whole truth. The mountains and valleys of the State make for a diversity of climate which, viewed superficially, seems extraordinary. The State has been called "a land of contrast and contradiction; a region of much sunshine and of much fog; a desert and a country of gardens. And because of the sea and the mountains, climate is so modified that men marvel, whereas it would be marvelous were it not so!"

It is scarcely possible to write of the climate of California; the State has many climates. These can be grouped for convenience as coast, valley, desert, and mountain; and although there are certain features common to all, the differences are as marked as the similarities.

TEMPERATURE

Coast—The coast of California has climates of great uniformity. In the part of the United States east of the Rocky Mountains the differences between North and South are strongly marked, and the terms have almost the same significance as cold and warm. In California this is far from the case, and north and south have little significance as far as temperature is concerned; temperature changes much more rapidly from east to west than it does from north to south, the differences are those of coast and interior rather than of latitude.

The records of the weather bureau may be quoted to show this relation between north and south on the Pacific and the Atlantic coasts and in the great Mississippi Valley. Average temperatures for the year are manifestly of little value as showing actual conditions, although even in these averages the differences are not as marked in California as in other

parts of the country. In the whole distance from Eureka to San Diego, nearly 700 miles, there is a change of temperature of only 10 degrees, while in the same distance on the Atlantic Coast the difference is 17 degrees, and in the Mississippi Valley it is 16 degrees.

California its cool summers and warm winters.

Valleys—The topography of California plays an important part in the temperature conditions of the portion of the State away from the immediate coast. A glance at the map will show that the mountains are for

TEMPERATURES OF CALIFORNIA COAST AND EASTERN POINTS

Latitude (Approximate)	AVERAGE FOR THE YEAR		
	California Coast	Atlantic Coast	Mississippi Valley
41° North	Eureka .....51°	Boston .....49°	Chicago .....49°
38° North	San Francisco.....55°	Baltimore .....55°	St. Louis.....56°
34° North	Santa Barbara.....60°	Wilmington .....63°	Memphis .....61°
32° North	San Diego.....61°	Savannah .....66°	Vicksburg .....65°
AVERAGE FOR THE COLDEST MONTH			
41° North	Eureka .....47°	Boston .....27°	Chicago .....24°
38° North	San Francisco.....50°	Baltimore .....33°	St. Louis.....31°
34° North	Santa Barbara.....54°	Wilmington .....47°	Memphis .....40°
32° North	San Diego.....54°	Savannah .....50°	Vicksburg .....47°
AVERAGE FOR THE WARMEST MONTH			
41° North	Eureka .....55°	Boston .....71°	Chicago .....72°
38° North	San Francisco.....59°	Baltimore .....77°	St. Louis.....79°
34° North	Santa Barbara.....67°	Wilmington .....80°	Memphis .....80°
32° North	San Diego.....69°	Savannah .....80°	Vicksburg .....80°

But more important than uniformity with change of latitude is uniformity throughout the year. While the differences of latitude between summer and winter on the Atlantic Coast are 30 to 40 and in the Mississippi Valley even greater, the California coast region has differences of less than 10. The region is, therefore, one of warm winters and cool summers when compared with almost any other portion of the country.

The explanation of the mild temperatures of California is to be found in the existence of the great ocean which lies to the west and in the fact that the winds blow from the ocean to the land. The temperature of the water of the Pacific varies little from 55 during the year, in some places it is less and in some places it is more, but everywhere it is relatively constant through the year. The air lying over this great body of water has nearly the same temperature as the water, but were it not for the westerly winds the climate of California would be as little influenced by the Pacific as the Eastern coast is influenced by the Atlantic. It is the westerly winds which bring the mild ocean air to the land and give

the most part unbroken ranges nearly parallel to the coast. The great valley of California, drained by the Sacramento and the San Joaquin rivers, is by far the largest, but Salinas Valley and the smaller valleys tributary to San Francisco Bay are of much the same general character. These inland valleys are sheltered from the ocean winds and show a marked difference in temperature and humidity from the coast region. While on summer afternoons the coast is cool and foggy, the valleys are warm and dry. In the great valley especially, summer afternoon temperatures are exceedingly high; at Fresno a maximum temperature of 115 has been recorded and temperatures of from 100 to 110 are not uncommon in the great valley and by no means unknown in the smaller valleys. The high temperatures occur with very low humidities, so that the thermometer is not a wholly fair indicator of the conditions, which are not nearly as oppressive as temperatures considerably lower in other parts of the country. The cooling during the night is very great, the difference between the highest and lowest temperatures in twenty-four hours frequently amounting to 40 or

more. Frosts occur frequently during the winter months; the first killing frost occurs about the first of December and the last about the end of March, but the occurrence of frost is widely different in different localities and in different years.

In the valleys south of the Tehachapi Mountains the minimum temperatures are not as low as in the great valley and the maxima are scarcely higher except in the desert regions to the east.

Deserts—The term desert has lost its terrors for Californians because of the fact that some of the most fertile regions of the State are properly classed as desert. The most spectacular of the desert regions is Imperial Valley, which is now a prosperous agricultural district with no less than five flourishing towns, although this region was an almost waterless waste as recently as the beginning of this century. The regions of the State known as desert are the whole southeastern portion except the region between the mountains and the ocean, and also the region east of the Sierra Nevada, known as Owens Valley.

This region is one of high afternoon temperatures and extreme dryness; the highest temperatures in the United States occur in this part of California; temperatures as high as 130 have been recorded in the Colorado Desert and a temperature of 134 was recorded in the shade by standard instruments under weather bureau conditions on July 10, 1913, at Greenland Ranch in Death Valley, which is a part of the Owens Valley region; this is the highest shade temperature ever recorded in the continental United States. In spite of this temperature and the reputation which Death Valley holds, it has been stated by the leading official of the weather bureau in California that "the records of the weather bureau uphold the belief that it is quite possible, if proper care be taken in the matter of supplies and provisions for physical comfort, to live and work in this section." This applies equally well to all parts of the desert in California. The only lack of the desert in the matter of climate is water, and where this

can be supplied by irrigation, the climate conditions for agriculture are unsurpassed.

Mountains—The mountains of California are generally cool throughout the year and hence furnish the great playground for the people of the State and for others who are fortunate enough to make the trip. In winter snow occurs in the Sierra Nevada and the northern portion of the coast ranges furnishing a large part of the water supply of the State. In the valleys among the mountains the summer days are warm and the climates excellent for many varieties of agriculture.

FROST

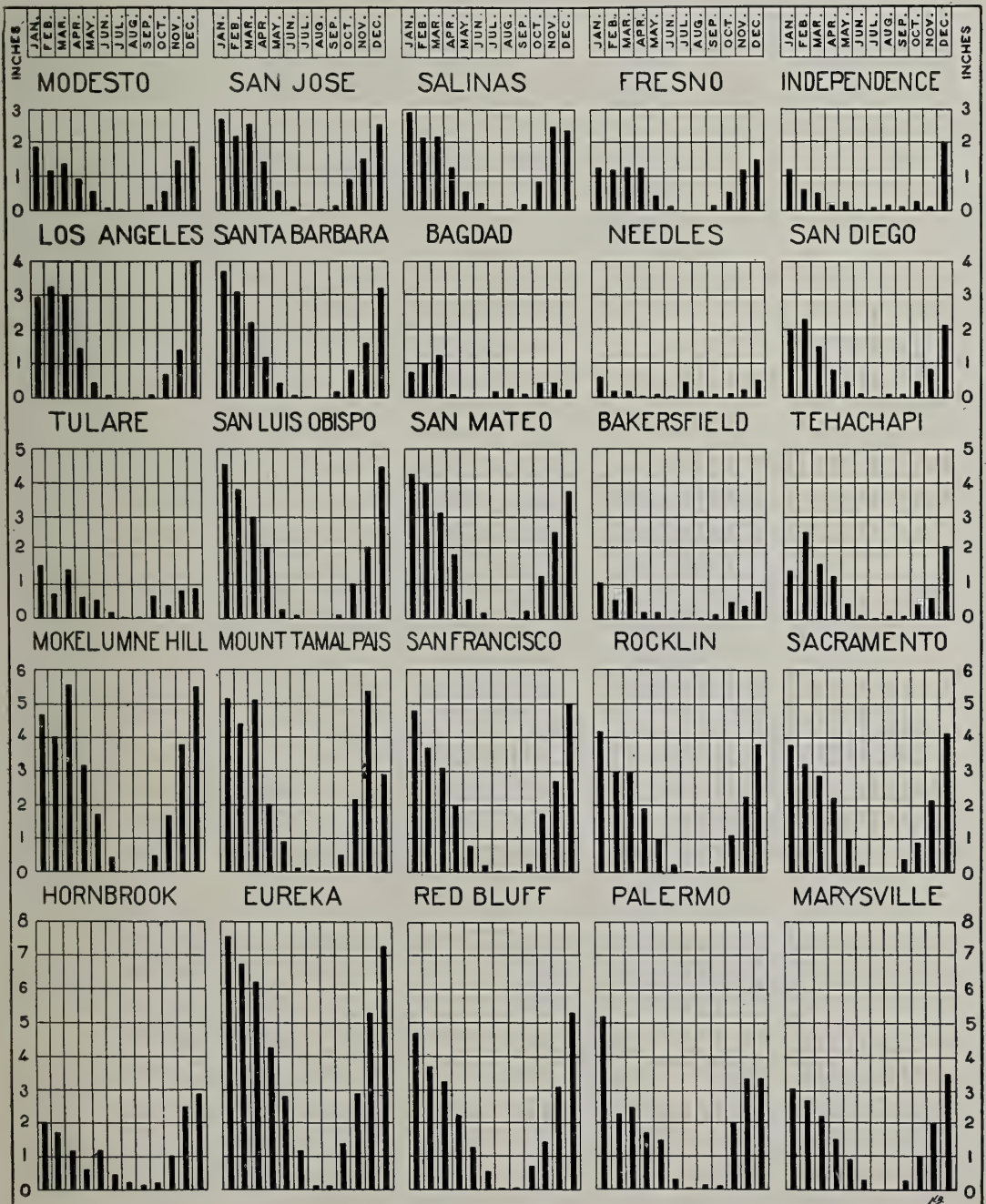
The frost problem in California is one upon which a great deal might be said. There is no part of the State which is frost free. North of the Tehachapi Mountains frosts occur every year except on the coast, and all parts of the region are subject to killing frosts from November or December to April or May, the period is a little shorter in the south and longer at the higher altitudes. South of the Tehachapi frosts occur only under particular conditions of wind and dryness so that frost may be regarded as a type of storm and can be forecasted as such, so that the necessary preparations may be made to protect against frost damage.

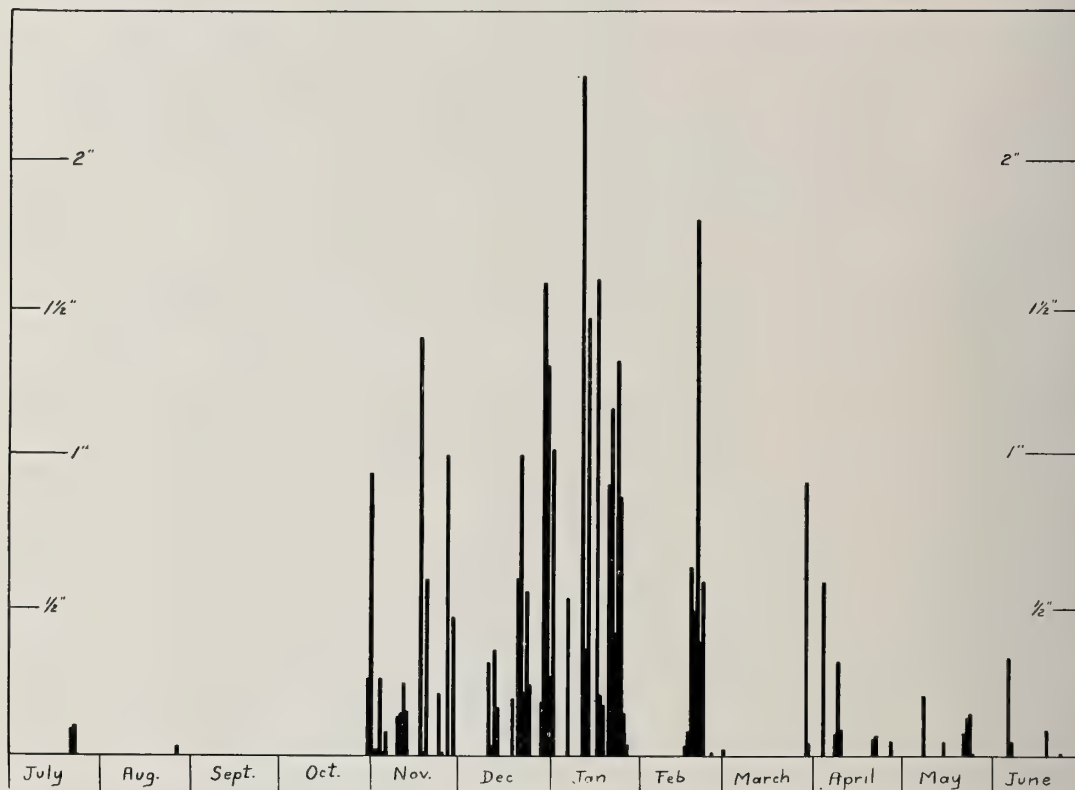
After a few days of a dry and somewhat boisterous north wind in the southern region of the State a clear, quiet night will result in more or less severe frosts. The valley bottoms are more subject to frost than the sides of the same valleys, as frost is mainly the result of the drainage of the cold air to the lower places. The studies carried on in this part of the State have made the prediction of frost by the weather bureau entirely practicable, and frost forecasts are now made with certainty twelve to thirty-six hours in advance of the occurrence of frost. This, together with the methods of protection in common use, have rendered damage to crops by frost one of the preventable losses and there is no reason why such damage should occur except through neglect of the proper precautions.

RAINFALL

Like the temperature the rainfall of California is the result of the position of the State. Over the greater part of the State the rain occurs in the winter months, about one-half the total coming from December to March. In the northern part of the State July

and August are usually rainless, the length of the dry summer increasing to the south where four months are usually without rain. The average monthly distribution of the rain at selected places in California is shown by the following figure. The amounts of rain vary widely with different parts of the State, from





the Colorado Desert, where the average annual amount is about two inches, to the mountains in the northern part of the State, where the amount in some cases reaches an average of 100 inches. The distribution over the State is best shown by the map which is based on all available records and indicates the conditions with considerable accuracy. In general there is more rain in the north than in the south, and more on the mountains than in the valleys. The streams supplied by the mountain rain and snow furnish the water for the development of the hydro-electric power of the State and for the irrigation of the drier valleys.

The rainy season is a time with a great deal of fair weather; the average for the State is about one rainy day in three during the winter months. The number of rainy days is greater in the northern part of the State and the dry summer is shorter than in the southern part. The rain comes in storms lasting for two to seven days at a time with periods of fine weather between the storms.

The character of the rainy season may well be shown by the diagram of the rainfall at Berkeley in the central part of the State for the twelve months, ending June 30, 1914, when the rainfall was somewhat more than the average. This figure shows the amount of rain for each day of the year, the longer the line the more rain; the months are marked at the bottom and the number of inches of rain at the sides of the figure.

In the drier parts of the State summer rains of the thunderstorm type occur; these are sharp showers, generally of short duration, in the afternoon hours. Occasionally these showers are of great intensity when they are known as "cloudbursts," and sometimes they do great damage, but the cloudburst is an abnormal thing and is a rare occurrence in any particular locality. In the mountains summer thunderstorms also occur at times.

SNOW

Snow is common on the mountains; it has an important effect on the State as upon the conservation of this snow depends the stream

This Map Shows the Climatic Conditions of California for Which it is Renowned

IN the opinion of experts, the California climate ranks high among its assets. The generally mild temperatures with the cool summers and almost total absence of winter as this season is known elsewhere in the United States; the long growing season with the abundance of sunshine, the heavy rains on the mountains furnishing water for irrigation and for power, and the even temperature of the coast region, give the State a combination of climatic conditions with which few regions can compare. Farming in this State is rendered far easier and far more satisfactory as a result of the climate. Our READERS' SERVICE can give you data as to the climatic and soil conditions in any section of the State. This data is absolutely authentic, being supplied by foremost experts of the State.



THERE are more than a thousand miles of seacoast marking California's splendid frontage upon the Pacific and throughout this Coast region the climatic conditions are surprisingly uniform. Some of the most ideal sites for homes are along this coast, where the ozone of the salt sea puts a tang in the atmosphere that creates energy and activity.

"This California which is just bursting forth into a new life is richer in resources and opportunities than any gold-seekers ever dreamed."

*—Dr. Benjamin Ide Wheeler,
President University of California.*

PERHAPS you have regretted that you didn't live in the days of '49, or if you did live then, that you didn't take advantage of the opportunity to make a fortune by coming to California with the gold-seekers.

DO YOU know that opportunities are plentiful today in California? Not, perhaps, surrounded by the glitter and romance of the "days of gold," but more certain. Remember, that even in those times not every man made "his pile." Luck had a lot to do with it and common sense also. Today the common sense is as necessary as then, but luck has very little to do with the case.

THE biggest brains in the State, men who know whereof they speak, will tell you that the California of today is the California of peace and progress and plenty. It is a land where no man need go hungry if he be willing to work; it is a State wherein men and women who do work are richly rewarded in not alone dollars and cents, but in contentment and peace of mind—which, most persons believe, are the most important things in life.

S E R V I C E

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NEW CALL BUILDING, SAN FRANCISCO, CAL.

flow during the dry summer months. At sea level snow is rare, although not unknown.

"In no portion of the habitable globe," says a California climatologist, "are seasonal rain-falls more watched and studied than in California. There are many sections of the United States where departures from normal conditions are followed with interest; but there is no district where an excess or deficiency in rainfall means more or is more directly and vitally connected with the community than in our own State." There is a wide fluctuation in the amounts of rainfall in different years, from scarcely more than a third to more than twice the normal. The records kept for over sixty years show that there is no regular sequence of wet and dry years or even of wet and dry months. An abnormally wet month may be followed by another wet month, by a month abnormally dry, or by a month with its normal amount, and the sequence seems to be a matter of absolute indifference. The record does show one thing very clearly and that is that the climate of California is the same now as it was sixty years ago and that the State is neither becoming wetter nor drier, but that, in spite of fluctuations in the amount of rainfall, the average remains the same, and that there are in the long run as many years of excess as there are of deficient rainfall.

FOG

In California there are two types of fog which are effective as regulators of the climate. The "tule fog" of the winter nights is a low-lying fog filling the valley bottoms to a depth of about a hundred feet, chiefly along the river courses; the blanketing effect of the fog often prevents frost. The foothills are for the most part above these fogs.

The other type of fog is the famous fog of the Pacific Coast; it is common from Mexico to British Columbia, although best developed in the vicinity of San Francisco. This fog, which grades into a low veil of cloud a thousand feet above the ground or less, locally known as "high fog," occurs in the spring and summer months shutting off the direct rays of the sun and thus preventing high temperatures. Although often a menace to navigation and

imparting a chill to the summer air which makes the Easterner shiver, the fog must be regarded as one of the most valuable of the assets of the California coast as it unites with the ocean influence to make for the cool summers of which the region is justly proud. The fogs also furnish a good deal of moisture to the trees of the region and take the place of rain to some extent.

SUNSHINE

California is pre-eminently a land of sunshine. The amount of bright sunshine in the great valley and in the desert regions exceeds 80 per cent of the daytime and even on the coast, in spite of the summer fogs, the average sunshine for the year is over 60 per cent. In San Diego, for example, there has been an average of 356 days a year when there was bright sunshine for an hour or more. In general, the sunshine of the interior portions of the State is greater than that of any other section of the United States, and greater than that of the Mediterranean region famous for its sunshine. The coast has about the same amount of sunshine as the Mediterranean.

WINDS

The prevailing winds of the coast region are from the west, but during the winter storms southeast winds occur. In summer the west winds blow steadily during the afternoon hours. Occasionally during the months of April, May, and June the west or northwest winds reach high velocities.

In the great valley the winds are prevailing from the north; they are occasionally strong and do damage. In the Sacramento Valley the summer winds are from the south; this well-known south wind, felt nearly every summer night, materially moderates the heat of the valley. The winds throughout Southern California are light except during occasional storms.

In general the winds of the State are cool; but the most trying climatic feature of California is the so-called "norther," or hot, dry wind from the north or northeast, which occurs in the valleys, chiefly in May, June, and July. In the southern portion of the State-

similar winds, known as Santa Anas, may occur in December and January. Their velocity sometimes exceeds twenty miles an hour and as much dust is carried they are generally disagreeable. There are, however, only a comparatively few days each year when this type of wind blows.

CLIMATE AS AN ASSET OF CALIFORNIA

Among the important natural assets of California the climate ranks high. The generally mild temperatures with the cool summers and

almost total absence of winter as this season is known elsewhere in the United States, the long growing season with the abundance of bright sunshine, the heavy rains on the mountains furnishing water for irrigation and for power, and the even temperature of the coast region give the State a combination of climatic conditions with which few regions can compete and which far surpass the conditions of climate under which the great mass has to live and work.

“CALIFORNIA is a land with many phases of soil and climate, of fruit and flower. Think of all the Arcadias and Avalons and Ardens in the world, of the wonder-waters and the enchanted lands. Think of the hushed benediction of the skies of Italy, shining between the Alps and seas; of the quick fruitfulness of Egypt's ancient sands nourished by the Nile; of the patient thrift of Holland's open plains rescued from the sea; of the yield of the Rhine slopes of Germany sunning on a thousand hills; of the luxuriance of Sahara's chance oases watered by the desert wells; of the rich pampas plains of Argentina, bordered by the fair gardens of Persia, scenting all the winds that blow—think of all these places of beauty and abundance, and I will show you a duplicate of any one of them in my California of many moods. She produces under one sky all that those other lands produce under their far-scattered skies.”—*Edwin Markham in "California the Wonderful."*

Seed Growing in California

By Lester A. Morse

President C. C. Morse & Co.

Editor's Note: Mr. Morse is the head of the largest seed growing enterprise in California, which was established by his father, the late C. C. Morse, and has added thereto a seed distribution business proportionally important. He therefore speaks from an experience of two generations. He indicates the particular lines of seed growing in which California is great and the sections in which each is most successfully grown. He also indicates California's place in the seed supply of the world.

DIFFERENT kinds of seeds require different soils and climates, and no one section of country will produce more than a comparatively few varieties. Because a section of country produces good vegetables or good fruit, it is no indication that that same section will produce good seed.

The whole State of California represents a great variety of climates and soils, and on the whole will produce a long list of vegetable, field, farm and flower seeds—a longer list than any country with the possible exception of France.

Interesting Instances—The valleys along the coast where fog is prevalent are peculiarly adapted to the growth of peas—culinary or eating peas. Owing to the cool weather and the dampness occasioned by fog, there are no pea weevils, and the seed is wonderfully well developed and bright. Peas grown in good, average soil hold their type well—much better than in the inland valleys. Peas have become a very important seed crop, and in 1912 fully 4000 acres were devoted to growing pea seed along the coast from Humboldt to Ventura.

Another important seed crop is beans, pole beans, dwarf, bush or string beans, and lima beans. We refer now to seed beans only and such varieties as are used by seedmen in their

trade, and not to beans as used commercially for eating dry. There is less area adapted to beans than to peas, but the Lompoc Valley and sections about Watsonville, Salinas, Arroyo Grande, and Santa Maria are wonderfully adapted to pole and bush beans, and the sections about Ventura and Santa Barbara are especially good for lima beans. There are limited areas in other portions of the State where these beans can be successfully grown, but the places just mentioned are the best adapted for superior quality—for fine, bright seed samples and the best reproducing qualities. The average annual acreage of seed beans is about 5000.

Good vine seeds, watermelon, muskmelon, squash and pumpkin, grow to perfection in the interior valleys, from Redding at the north to Bakersfield at the south. These plants require good, hot summer weather, and with such climate, rich soil and irrigation, good crops of fine quality are fairly sure. As yet there is but a limited area devoted to these crops, but with better knowledge of production the acreage will increase.

California sweet corn does best in the sections just adjoining the coast, where it is neither hot in summer nor foggy. Good field corn is produced in the Sacramento Valley,



California's Carpet of Gold—Poppies growing for seed

and can stand rather more hot weather than sweet corn. Until only a few years ago (not more than five), California grown corn was not supposed to produce good seed, and most of the seed used was imported from the Middle West. It was found that the reason for failure was simply lack of knowledge. When the same intelligence was applied in selection, cultivation, and choice of location as is applied to other kinds of seeds, it was found that our California grown corn seed does better on the Pacific Coast than Eastern grown, and the future of corn growing for seed is bound to show a greatly expanding acreage.

Up to the present time there is but little beet seed produced in California, and practically no cabbage, mangel, sugar beet, turnip, cauliflower, rutabaga, egg plant, or pepper. These could be grown by going farther north

for the brassicas and mangel and further south for pepper and egg plant, but there has been no especial encouragement for these items since the European source of supply has hitherto been satisfactory. The future may force all of these lines to our coast.

Garden Vegetables—California seed farms are famous all over the world and practically all seed dealers know us, but what are commonly known as California seeds in vegetables are carrot, celery, endive, leek, lettuce, onion, parsley, parsnip, radish, salsify, and tomato. All of these items are produced on a large scale, and the California crops of same practically set the growers' prices for the world. All are grown in great variety and all are sold to dealers everywhere.

So far as quality of the strains is concerned, most of these California crops must compete

with France and Germany, and during full years the European crops hold the foreign markets. But California onion and lettuce seed is superior to that produced anywhere else. Here we have the best possible climate for developing, curing, threshing, and cleaning seed. Lettuce requires a semi-arid climate for ripening, and here it receives full share of dry summer weather, so that the sample of seed is immeasurably superior to foreign grown. It is quite impossible to grow lettuce seed in countries where summer rains are frequent.

California radish makes a larger root and rather larger top than foreign grown stocks, but the seed is a much finer sample and has a very high vitality which is lacking in seed from other sources. It makes the very best radish for kitchen garden purposes, though not always popular with green house market gardeners who wish small tops and small, early roots.

Onion seed as produced in California has met and overcome a very decided and persistent prejudice. As a rule the onion reproduces itself better in its immediate environment and Eastern grown or foreign grown onion

seed is very likely to run largely, if not entirely, to scallions or stiff-necks when used here. The same result is likely with the onion seed taken from any one climate to another, but California seed will make a well ripened, merchantable bulb in any locality where onions are grown. It is remarkable to be able to pick out a plot of onions grown from California seed in England, or France, or Germany, and find them invariably all uniformly ripe and well matured, free from stiff-necks, and all varieties usually ripened earlier than the same variety from other sources.

For these reasons just mentioned, California is the chief world's supply for onion and lettuce seed, and is rapidly becoming so for radish, celery, and the other California specials just enumerated.

California Flowers—When it comes to flower seeds, the list of varieties and species is only limited by the cost of production. Practically all flower seeds could be grown in California if protected from European labor competition. As it is, many flowers are now grown here on a large scale and the area is rapidly increasing.



Where Utility and Beauty Mingle—Radish in blossom



Planting Onions for Seed

Exclusive of sweet peas, three firms south grow a total area of fully 500 acres, and devoted to candytuft, cosmos, stocks, asters, poppy, etc.

Sweet peas, of course, are the great California leader, and practically the world's supply is produced here. California has the proper soil and climate for sweet peas and many growers are sweet pea specialists. For the past three years the country about Santa Clara Valley, San Juan Valley, Arroyo Grande, Lompoc,

and Los Angeles, has contained no less than 2500 acres each year all planted to sweet peas for seed alone. All classes, all types and all varieties are produced in these localities, and the seed when harvested is shipped to all parts of the world.

While now noted for seeds of a very great variety and destined to increase the list very much, California is now and always will be celebrated for the great triumvirate of onions, lettuce, and sweet peas.



Where seed is grown for a good part of the world—Panoramic view of different seed blocks on ranch of C. C. Morse & Co.

Fish *and* Game: One of California's Great Resources

By Ernest Schaeffle

Executive Secretary California Fish and Game Commission

Editor's Note: Fishing and hunting are largely counted "sport" in the public mind, but Mr. Schaeffle discusses fish and game as an important resource of the State, both directly and indirectly. This resource is large, unique, and influential in State development and exceedingly interesting, also, as Mr. Schaeffle presents it. The preservation and protection of wild life of a beneficent kind is recognized in all civilized nations as a public duty and benefit, and Mr. Schaeffle's article shows forcibly what California has to do in that line. By constant contact with those who are close to Nature and her animal product, as well as by study and personal investigation, the writer of this fascinating article is enabled to handle the subject with no uncertain pen.

WITH the last few years a great many people have come to realize the fact that the fish and game of any region have a tangible value, which can be measured in dollars and cents just as we have long measured the value of the forests, the mines, the water powers, and the lands. In the writer's opinion this newly developed sentiment is a fortunate thing as it would seem to present a convincing argument in favor of conservation to the thousands of people who would be unable or unwilling to consider any other argument less material in nature. It is true that we have always had a comparatively limited number of people who were natural conservationists and who objected to the waste and destruction of any natural resource. We have also numbered among our population a certain number

of thousands of sportsmen who may be said to have had a purely selfish interest in saving the fish and game supply for the pleasure of themselves and of their children after them. The influence of these two classes, however, has never been sufficient, and probably never would be sufficient, to insure the effectiveness of conservation measures necessary for the perpetuation of the wild life resources of any state; but with the realization of the fact that fish and game have a very great value to a state in the dollars and cents expended by resident and foreign sportsmen in the pleasures of the field, has come an entire change of sentiment on the part of thousands of farmers, mountaineers and others who were formerly indifferent or even antagonistic to preservation laws and methods.

California has always been singularly fortunate in the possession of rich and varied wild life forms. This wealth in fish and game has as a natural consequence developed a fishing and hunting class larger in proportion to the total population of the state than borne by any similar sporting population in any other state or country. That this statement is justified, we have only to consider the fact that each year the fish and game commission is issuing 160,000 individual licenses to hunters and 85,000 licenses to those who fish for pleasure, to say nothing of the licenses that are issued to the 4000 commercial fishermen of the state. These totals seem to be exceeded in only three or four states in the Union, states in which the population is very much greater than in California. From the records that are available it seems that California is now being led only by Pennsylvania, New York, and Illinois, while it is interesting to note that in Great Britain, with its population of close to 50,000,000, less than 65,000 game licenses are issued annually.

WHAT INDUSTRY MEANS

Now let us estimate, if we can, just what this hunting and fishing "industry" means to the State in the mere expenditure and distribution of money. Of course every hunter needs guns, ammunition, special clothing, tents, and camping outfits, trained dogs and other gear and paraphernalia so varied as to be impossible of appreciation by any one who has not taken a part in the game. Furthermore, as the best hunting and fishing grounds are not situated in the outskirts of our big towns and cities, the sportsman must travel, often considerable distances, which means that his outlay for railroad fares, stage, and auto fares and for express charges is a very considerable item. Added to all these other matters of expense are the cost of accommodations at the thousands of country hotels, boarding houses, and camps that have sprung up in the last generation from one end of the State to the other and in every district in which game and fish can be found.

The president of the fish and game com-

mission, Mr. Frank M. Newbert, who has had opportunities for studying the fish and game industry probably superior to those of any other person in the State, estimates that the yearly expenditure in California on account of fish and game reaches the surprising total of \$15,000,000. We lack the space to consider the details of the expense included in the total given but Mr. Newbert's statement is based upon years of study and undoubtedly is nearer the correct amount than would be an estimate made by any one else in the country.

If the statements just offered are accepted, it would seem that the case of the conservationist is complete, but there is no need of stopping here as there are still additional facts to be presented which may be of some interest. In the first place we find that in practically every other state in the Union there has been during the last twenty-five years a regrettable diminution in the supply of fish and game. This reduction in the supply is having two results, according to the observations of state and national conservationists. The first is that there has been an inevitable cessation of hunting and even interest in hunting and in conservation in all of the states in which the game supply has been depleted. Secondly, we find that each year, from the states in which game has become scarce, there is an increased migration of hunters and fishermen to the more fortunate states, like California, that have preserved a satisfactory proportion of the original wild stock. While it is true that the number of these outside sportsmen who have thus far come to California for their annual outing, is comparatively limited, there is reason to believe that more and more of these visitors are reaching us every year with the probability that within ten years the State will entertain from 25,000 to 50,000 of them each season. In the writer's opinion this is a very fortunate development for many reasons. Not only will these good people come here each season, often bringing their families with them, to the financial betterment of the State, but many of them who otherwise would not become acquainted with the advantages



Mexican Wild Turkey; introduced from west coast of Mexico by the State Fish and Game Commission.—Reproduced by natural color process from original painting by Louis Agassiz Fuertes, probably leading bird artist of the world.



Mountain Quail—common throughout a large portion of the mountainous districts of California.—From drawing by Louis Agassiz Fuertes



California Valley Quail—finest upland game bird in the world.—From drawing by Louis Agassiz Fuertes

offered here, will find farms, locations in timbered areas, openings in manufacturing and other commercial lines and will remain here to the State's very great betterment in all ways.

That the readers of this remarkable publication may have some idea of the attractiveness of California in a fishing and hunting way, we will endeavor to sketch very superficially and briefly the possibilities that offer themselves both to the resident sportsmen and to those who may be so fortunate as to visit our land. Probably the finest hunting that we have, the hunting that is enjoyed by the greatest number of people, is furnished by the deer. The deer is rightly considered the most valuable form of game we have in the State because of its general distribution, because of its great value as food and because of the thrilling sport it affords to so many thousands of hunters. It is found in every county of the State with the exception of San Francisco, and in fact is hunted and killed each year in considerable numbers within twenty miles of the metropolis. Probably no county of the State of like area has furnished so many deer as has little Marin, which lies only across the Golden Gate from San Francisco. Surprising as it may seem, the annual kill in this little county, a large part of which is covered with the suburban residences of San Francisco people, numbers around 400 deer, all males, of course, as the State law does not permit the shooting of female deer. According to figures which have been painstakingly gathered by the fish and game commission, the deer hunters are now lawfully taking an average of over 8000 deer a season. If we add to this total the numbers unlawfully killed and the numbers killed of which no account is given, it is probable that the total killed for the State amounts to over 15,000 animals. As large as this total may seem there is apparently no reason for alarm as in every part of the State, except Southern California, there are reports of a gratifying increase in the supply. This increase is due no doubt to the fact that there has been no deer hunting in California for commercial purposes for years and to the further fact that the female animals have been carefully protected.

Next to the deer in interest and value come the wild fowl, the geese, the sea brant, the ducks, and the shore birds. While not so generously distributed as other forms of game, they are fairly well represented in every section of the State, even in the southeastern desert region, strange as it may seem. From data collected by the fish and game commission it appears that not less than 1,000,000 wild ducks and 100,000 geese are killed in the State each year. Unfortunately, no figures as to the kill of shore birds are available, although of course their numbers are very much less than those of the larger varieties of wild fowl. At the present time the great wild fowl regions are the overflowed areas in the Sacramento and San Joaquin valleys, the marshes adjacent to San Francisco, San Pablo, and Suisun bays, the bays along the shore line in Humboldt and Del Norte counties, the swamps and lakes in Northern and Northeastern California, the marshes and artificially created club lands along the southern coast, and the irrigated areas in Southeastern California in what was formerly desert. Being as it is the wintering ground of millions upon millions of wild fowl bred in the north, there is every reason to believe that California will continue to hold its important place as a sportsman's paradise. At the present time the State laws give ducks, geese, and shore birds needed protection, while supplementing them we have federal regulations which in time no doubt will be rigidly enforced and a guarantee against the extermination of any species protected under their many provisions.

PLENTY OF QUAIL

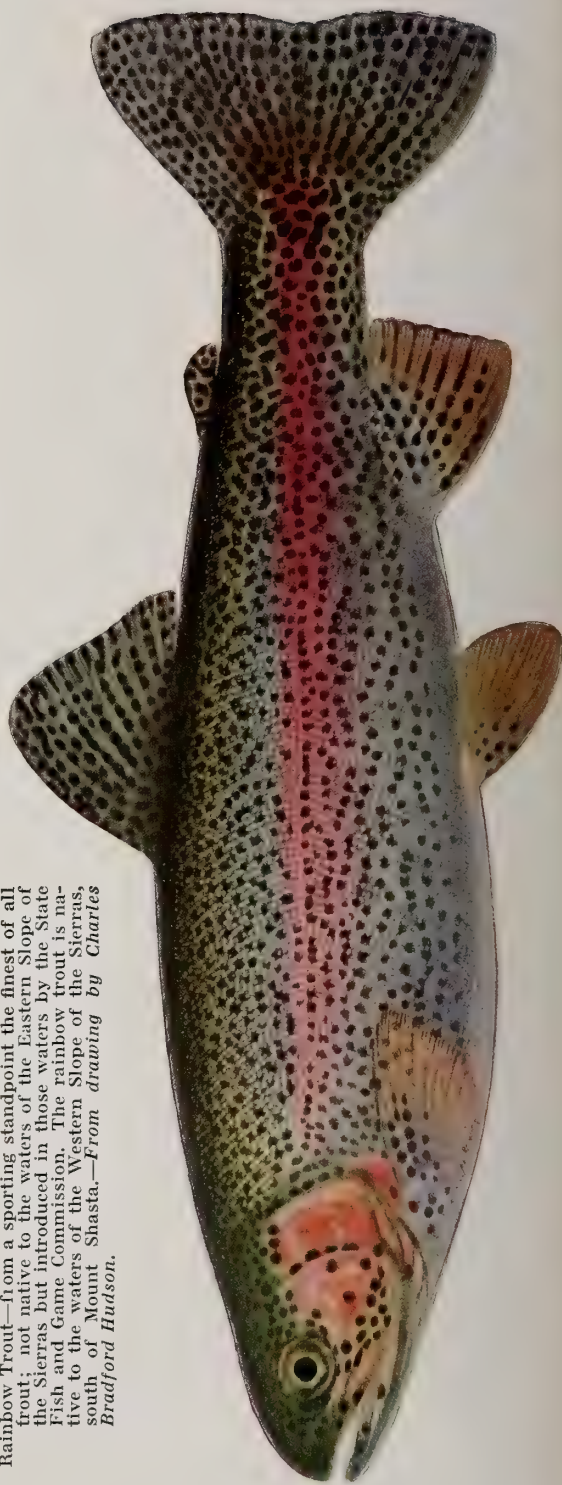
California is peculiarly fortunate in its upland game birds. The valley quail alone, found practically from one end of the State to the other, furnishes hunting which can not be excelled anywhere or by any other variety of game. This bird finds a congenial habitat at least somewhere in every county in the State. The number of men who go afield in its pursuit runs into the thousands.

To the angler, few parts of the world offer such varied attractions as does this State. Whether his hobby be fishing for the humble mud cat, fly casting for the beautiful rainbow



Chinook Salmon, also known as Quinnat Salmon—famous salmon of the Sacramento, Eel, Klamath, and Columbia rivers. An important game fish of Monterey Bay, Cal., where thousands are taken annually by anglers.—From drawing by Charles Bradford Hudson.

Rainbow Trout—from a sporting standpoint the finest of all trout; not native to the waters of the Eastern Slope of the Sierras but introduced in those waters by the State Fish and Game Commission. The rainbow trout is native to the waters of the Western Slope of the Sierras, south of Mount Shasta.—From drawing by Charles Bradford Hudson.





Steelhead Trout—common trout of the coastal streams of California, and which sometimes reaches a weight of 35 pounds.—*From drawing by Charles Bradford Hudson.*

Eastern Brook Trout—introduced into California by the State Fish and Game Commission.—*Reproduction from drawing by Charles Bradford Hudson from living specimens. Mr. Hudson is the most celebrated painter of fish in the world.*





Chinese Pheasant—also known as the China, Ringneck, Denny, English, and Oregon pheasant and incorrectly known in the United States as the Mongolian pheasant. Introduced and propagated by the State Fish and Game Commission at the State Hatchery at Hayward. Distribution made by commission throughout the humid coast districts where the birds are thriving and multiplying.—
From painting by Louis Agassiz Fuertes.

trout, surf fishing for the many species which frequent the coast, or the pursuit of the lordly tuna or sword fish, he may have his fill. Supplementing the work of an already generous nature, man has in California done some of the greatest work in acclimatizing imported species and in propagating and distributing both native and imported varieties of trout and other fish that has ever been accomplished. While many of the streams of the State naturally suited to trout and other fish were found teeming with them by the pioneers, the range of many species has been extended through transplantation so that today we find even the small streams and lakelets in the high Sierras literally alive with beautiful gamey fish, while to the numbers of native species have been added such splendid fish as the large mouth and small mouth black bass, crappie, yellow perch, striped bass, the brook trout of the Eastern streams, the Loch Leven or Scotch Lake trout and the German brown trout (*Salmo fario*), of Europe. This work of introduction, artificial propagation and transplantation so well begun is being prosecuted in increasing magnitude each year. The State now operates eight hatcheries with the possibility of opening two more within the next year. From these eight hatcheries each year are planted an average of around 12,000,000 trout, the distribution of which keeps a special distribution car on the road six months out of each year.

ENORMOUS FISH "CROP"

To do justice to the subject of the State's commercial fisheries volumes would be needed. We have over 4000 people engaged in the actual catching of fish. Their annual "crop" amounts to 87,000,000 pounds (in round numbers), and has a value to them of \$4,000,000. While it is impossible to secure complete figures as to the retail value of the catch, it seems reasonable to place the total at the very respectable figure of \$10,000,000. That even this great business is capable of further development is shown by the history of the tuna or albacore industry, which three years ago amounted to practically nothing and for the season of 1914 brought the canners \$1,600,000.

It is believed that this single industry will be increased in value by 50 per cent during the present year.

The salmon industry is of peculiar interest, not alone because of its annual value to the fishermen of \$500,000, but because of the fact that it owes its revival and continuance almost solely to the hatchery operations of the National Bureau of Fisheries and the State Fish and Game Commission. In 1885 the State first took up the artificial propagation of salmon, it having developed that the salmon, particularly in the Sacramento and its tributaries, had become practically extinct. This diminution in the salmon runs was due to the fact that with the advent of the white men there had been a great demand for the salmon in the Sacramento River and with no hatcheries to increase their numbers or adequate laws to protect the breeding fish and with the great spawning beds on Feather, Yuba, Bear, and American rivers destroyed by mining operations, their numbers had lessened year by year. The salmon had abandoned many of the streams altogether as the eggs deposited on the spawning grounds did not hatch, being destroyed by the detritus from the mines. In 1885, the state commission established a salmon hatchery on Hat Creek, a tributary of Fall River. This hatchery was later abandoned and a larger hatchery opened at Sisson. The output of the latter hatchery alone has brought the salmon back to the waters of this State and in sufficient numbers to make possible a profitable industry which shows no signs of decreasing in volume or profits to those engaged in it.

With a revenue of around \$300,000 each year from the sale of licenses to sportsmen and market fishermen and from fines collected from violators of the law, California is assured that all means necessary for the perpetuation of its fish and game supply can and will be carried out, particularly as during recent years a public sentiment has developed which recognizes the value of the State's wild life resources and demands that they be conserved for the benefit of those who are here to enjoy them now and for those who will come after us.



Automobile Road leading through the imposing forests of primeval redwoods, along the northern coast of California, where every turn discloses new wonders.

Courtesy Northwestern Pacific Railroad Co.

Agricultural Potentialities *in* California

By Dr. Thomas Forsyth Hunt

*Dean of the College of Agriculture of the University of California and Director
of the University Agricultural Experiment Stations*

Editor's Note: Dean Hunt, who has under his personal supervision all the great agricultural activities of the University of California, is a close student both of the present and future of the State, whose leading industry is farming. In the following article Dean Hunt discusses the relation of population and transportation to agricultural development, as well as giving tersely some clear and logical reasons why the farmer does or does not succeed. He sums up the matter in the statement that it is the income per unit of labor that makes a successful farm.

A FEW weeks ago I wended my way along the busy wharves of San Francisco Harbor with the quarantine officer of the state commissioner of horticulture. He was on his way to inspect the fruit and vegetables aboard a steamer just arrived from Honolulu. While we were on this steamer the officer pointed across the slip and said: "Do you see that boat?" It was the freight steamer *Pennsylvanian*. "Just sixteen days ago," continued my guide, "that ship was tied up in the North River, New York Harbor. It carries 8000 tons net." A few days later I met the secretary of the chamber of commerce of San Francisco. "We now have a rate of 30 cents a hundred on canned goods from San Francisco to New York by way of the canal," he said. "The former railway rate was 90 cents. For the first time in the history of this coast we are now able to sell canned goods in Southeastern United States," he added.

By means of the San Joaquin and Sacramento rivers, as well as by four railway systems, the fertile interior valleys of California

have potentialities possessed by few, if any, regions in the world. Fifty to \$100 worth of farm products per acre is not uncommon with irrigation; in fact it is almost common. Leasing land at from \$15 to \$25 per acre is a favorite pastime. When shipped in sufficient bulk from river landings, six cents moves 100 pounds of freight by water from the center of this great area to the San Francisco Bay, while 30 to 50 cents additional sends it, in sixteen to twenty days, to the Eastern seaboard. By cutting the American continent in twain, California has been placed in the front yard of New York; when fast passenger steamers are placed in service we will be on the front porch.

I have been greatly interested in three tracts of land. One of these tracts is the nine North Atlantic states, the six New England states plus New York, New Jersey, and Pennsylvania. It is a tract of 100,000,000 acres. The second tract is California. It is also a tract of 100,000,000 acres. The third tract which has interested me is a tract of land belonging to one Mr. Terrazzaz, now sojourning in El

Paso, Texas, for reasons with which we are not concerned in this article. It occupies about three-fourths of the state of Chihuahua. It is said to be a tract of 100,000,000 acres. The first of these tracts, the nine North Atlantic states, contains 25,000,000 people. The second tract of equal size, California, contains 2,500,000 persons. I do not know how many people live on the 100,000,000 acre Mexican ranch, but suppose, to make the picture complete, that there are 250,000 souls. There are single counties in California that, if they were as densely populated as Massachusetts, could hold the present population of California.

The 25,000,000 people of the North Atlantic states are better fed, better clothed, better housed, and better educated than when there were only 2,500,000 inhabitants. It is not asserted that this is due necessarily to the greater population, but that it is true in spite of it. Some day, probably within the life time of persons now living, California will contain not less than 10,000,000 people. When that day comes we can expect them to be better fed, better clothed, better housed, and better educated than the present population, which perhaps has no superiors at present in these particulars in the world.

The greater population of the North Atlantic states is due to the fact that those states face upon the same ocean as the countries of Europe. These states have had the wealth created by the vast number of immigrants without having the expense of raising them to the wage-earning age. Had the Pacific Coast states, with their fertile soils, rich ores, vast water power, and unexcelled climate faced the Atlantic Ocean, they might now contain 40,000,000 people instead of 5,000,000. It costs an immigrant two and one-half times as much to reach San Francisco from Genoa as it does to reach New York. Fifty years ago the differential was vastly greater. As soon as boats begin to run directly from Bramerhaven or Naples to San Francisco by way of the canal, it will probably cost the immigrant only 50 per cent more to reach the Western Coast than the Eastern Coast. It is not necessary to

assume that more immigrants will come to America, but merely that they will be differently distributed.

In 1910 17,000,000 acres of the 28,000,000 acres of the farm lands in California were held in ranches of over 1000 acres. It is estimated that there are 50,000,000 acres of land in California suited to agriculture. Only six per cent of this area, or three per cent of the total area, is held in farms of under 175 acres.

There is a certain county in California containing 805,760 acres, which in 1910 was reported to contain 663 farmers. The total area in farms was 491,198 acres, or 741 acres per farm. A small reclamation project has been developed in this county. Settlement began in 1911. Two hundred and sixty families now occupy 8000 acres, 7400 of which are under irrigation. It is estimated that in 1914 \$100,000 worth of a single product—butterfat—was sold from this area. There is nothing to prevent the sale of \$500,000 worth within five years. The bank in the town adjoining this project has 1575 depositors with deposits aggregating \$404,000. Note that this is less than one per cent of a county which in 1910 was reported to contain 663 farms.

When this 8000 acres was a sheep ranch it may have brought in 10 cents an acre. It now contains about 260 thirty-acre farms, each with a family averaging four and one-half persons. The people of the project recently sent a representative to Washington to say to Secretary Lane that they had no complaints to make. If this were not an unusual case it would not have been quoted here. Nevertheless it illustrates the agricultural potentialities of California, because this instance may in the future be duplicated many, many times, if only the right methods are employed.

The citrus industry offers a further illustration of what may be accomplished. In 1890 there were 4000 carloads of oranges and lemons shipped from California. In 1914 nearly 50,000 carloads were handled. Last year the consumers paid \$86,000,000 for the citrus fruit raised in California. It is estimated to have been raised on 125,000 acres. When this fruit was hanging on the trees it

was worth 25 per cent of what the consumers paid for it and it is estimated to have given employment to 8000 families. How many families were supported by virtue of the remaining three-fourths which the consumers paid can only be surmised.

Like all other places, California has two sides to its shield. Success depends upon knowing what is on both sides of the shield. In California, as elsewhere, too many people have been living off of the increased value of the land and unfortunately have been living off this increment before it was earned. Some people look upon this as a local phenomenon. While it may have received greater emphasis here than elsewhere, it is only a part of a widespread disease. This unearned increment has made possible the extravagant living for which the past fifteen years have been noted. Few people can live extravagantly unless they issue their promissory note against the future.

It is not that the wholesale price of land is too high in California, but the overhead charge of dividing up these lands and finding settlers has been too great. Nowhere has the art of selling been developed to a greater degree than in California. Often the art of buying has not been equally developed in the newcomer. The goods are here but sometimes the buyer does not find them. Not infrequently the seller displays his shelf-worn articles.

REASONS FOR ERROR

Buyers have commonly been led into error for the lack of understanding three factors:

1. The time required to make a farm a going concern.
2. The value of a dollar.
3. The requirements of a successful farm.

When fifty years ago the pioneer went into Iowa he had only to turn the furrow in order to seed to oats or plant corn. In from three to six months he deposited in the bank the cash for the crop. When his son came to California, he found conditions different. In an irrigated region, water must be brought to the tract, the land must be leveled and checked before a crop can be started. While a slight return may be made the first year a going concern can not be made with a piece of raw land under irrigation short of two years and

in some of the more profitable lines it takes from three to five years. The less capital to start with the longer it takes.

A dollar does not go as far in the Pacific Coast states as it does in the older and more thickly settled ones. Labor is higher. The cost of long hauls must be added to the cost of materials. It will all come back in the end if wisely expended, but this does not help the man while he is getting started. I received a letter from a prospective settler in the Middle West who had a couple of thousand dollars to invest. He said he had read in the highly colored prospectuses of leading development firms that anything could be raised from a bean to a fig tree. He appealed to me for some believable information concerning the products of California. It was necessary to say to this prospective buyer that it was perfectly true, in California anything could be raised from a bean to a fig tree. Further that what was said in the highly colored literature which he had received was quite possible, but it was not evidence that he could make a living on a farm in California. His success would depend wholly upon his wisdom in purchasing and his own ability as a farmer.

There is an old English saying which reads, "If wishes were wagons, beggars might ride." It takes more than a wish to become a successful farmer. If it were not so there would be more competition in farming than there is at present. Oftentimes a competent man could make a living where another has made a failure, but the man who is competent to make a living under the particular conditions would have known enough to have purchased elsewhere. Many persons have no adequate conception of the requirements of a successful farm. Neither will this article undertake to list them, but this much may be said, that it is not the yield per acre nor the per cent earned on the investment that makes a successful farm. It is the income per unit of labor. Neither is this income to be reckoned wholly in dollars and cents; it comes in certain human satisfactions that no money can buy. In these latter respects few, if any, places have greater potentialities than California.



THERE is a certain weirdness in the grotesque form of these monster trees, which shadow a winding road near the coast of the Pacific Ocean, not far from San Francisco.

Rural Credit *and* State Development

By Col. Harris Weinstock

Member from California of the American Commission on Agricultural Co-operation and Rural Credit

Editor's Note: After years of zealous study of finance from the point of view of human interest through the increase of individual prosperity in agricultural production Colonel Weinstock has arrived at the conviction that the state should adopt a plan for fair finance in farming. His beliefs in this direction are widely shared by the citizenship of California, and the following contribution will therefore meet with sympathetic interest. As a member of the American Commission on Agricultural Co-operation and Rural Credit, Colonel Weinstock has had an excellent opportunity to investigate the problem from many angles and gives his readers herein the summed-up results of his findings.

IN 1913 two commissions were appointed, one by the state government, representing a group of about sixty commissioners, known as the American Commission, and the other consisting of seven federal commissioners, appointed by the President of the United States, to visit Europe to investigate the various systems of European rural credits, and to report thereon to Congress.

As one of the commissioners for California appointed by Governor Hiram W. Johnson, I brought back with me from my European investigations, two valuable demonstrations: First, the amortization method of payments of farm mortgage loans; that is, spreading the re-payments over a long period of years. Second, the plan of issuing marketable land bonds in lieu of land mortgages.

I found that these two ideas have been put into successful operation in Europe, and have done much to revolutionize the rural conditions of Europe. The system has enabled the small-

est European land owner to borrow money on long time payments, at the world's lowest rate of interest; in other words, the smallest German, French, or Italian farmer could borrow the little money he needed in the markets of the world as cheaply as a Rockefeller or a Pierpont Morgan.

I found, further, that the system as applied by the British Parliament to Ireland had brought about a social and economic revolution in that little country, unparalleled in the world's history. The Irish land bill enacted by Parliament a decade or more ago, created a royal commission with the power to appraise the value of and to condemn the large landed Irish estates; to buy them from their absentee landlords, paying them a bonus of about 12 per cent above the appraised valuation; to cut up these great estates in small parcels, sell them to selected Irish tenants, advancing them 100 per cent of the purchase price, and granting them seventy-five years

time in which to make annual repayments, at the rate of about one-half of one per cent on the principal, charging them only three per cent interest on the deferred payments.

This system has within a decade converted over 300,000 poverty-stricken, wretched, unhappy, discontented tenant farmers into over 300,000 happy, prosperous, contented, and progressive landed proprietors, so that little old Ireland, from being the most miserable and poverty-stricken country in all Europe, has become one of the most prosperous countries in the world.

INVITING THE WORLD

In a crude and an imperfect way, we of California have appreciated the importance of breaking up our great bodies of land owned by the few, into small parcels, inviting people from all over the world to become farm colonists in our midst. Great fortunes have been expended throughout the nation and elsewhere, inviting people to engage in California agriculture and horticulture, but our methods have been so crude and so unscientific, and the love of greed on the part of land promoters has been such, that a very great proportion of those who have been induced to come here, and to buy our acreages, have failed with great misfortune to themselves, and with serious injury to the State.

The usual method of procedure in attempting to colonize in California has been for a group of capitalists and promoters to get together, to buy up a body of land, paying, as a rule, \$35 to \$40 an acre for the raw land, to spend \$50 or \$60 an acre thereon to water and to improve it, to spend an additional \$40 or \$50 an acre in advertising it, and then to sell it to colonists at about \$200 an acre, which, even then, would only allow a reasonable margin to the promoters.

Blinded by glittering statements and great promises of future possibilities many within and without the State were led to invest their little all in such colonization schemes. As a rule, they would be called upon to pay down at least 20 per cent of the purchase price, with, say, four or five years additional time to pay the balance, at a maximum rate of

interest. Comparatively few of these purchasers would be scientifically trained farmers or fruit growers. As a rule they would be Eastern people, some with no farm experience and some with farm experience that would not fit into the California climatic conditions, and some of them city-people seeking rural homes. As a consequence, the land would have to yield annually enough to pay about 20 per cent on the purchase price, the maximum rate of interest on the deferred payments, and to afford a living for the colonist and his family, despite the fact that the soil may have proven most inferior and despite the further fact of the lack of experience on the part of the colonist. As a consequence a frightfully large proportion of such investors have come to grief; have been forced back to the cities, many of them as unskilled laborers, to swell the ranks of the casual unemployed and many of them have cursed the State as a delusion and a snare; have shouted their misfortunes from the housetops, and have thus injured California in the eyes of their sympathizers here and elsewhere.

Compare this crude, unwise, and unscientific method of colonization with the plan followed, for example, by Australasia. The Australasian government made the matter of farm colonization a state affair. In those dominions, the State sends its experts out to spy out the land and to buy desirable tracts at the lowest market rates. Such land is then drained, watered, and improved, again by experts, at the lowest possible cost, cut up into small parcels and sold to carefully selected colonists who have the body and the brains that are essential to farming success. In the State of Victoria, Australia, for example, the cash payment required on the land by the State is only 3 per cent of its sale price, and thirty-one and one-half years are given in which to complete payments, with interest on deferred payments at $4\frac{1}{2}$ per cent. Besides giving this long term of payment and requiring this low rate of interest, the state builds houses for the settlers, on cash payments, for about a quarter of the cost, the remaining payments being allowed to extend over twenty

years, with interest at five per cent. Furthermore, the state details expert graduates from its agricultural colleges to settle among the colonists, and to play the part of teacher, friend, guide, and instructor, all with a view to taking the inexperienced by the hand, and teaching them as speedily as possible, scientific farming. As a result of this wise, beneficent, and scientific method, Australasia is rapidly becoming an object lesson to the world in successful farm colonization, adding greatly to the wealth of the state and to the prosperity and the well being of its people. The Australasian dominions, to finance these schemes, issue state bonds, and by virtue of the high credit enjoyed by those countries, are enabled to borrow money in the world's markets, at the lowest current rate of interest.

Whereas, in the Western United States, 100 per cent and over is more often added to the original cost by the land promoters, in Australasia the colonist gets his land at the actual cost of the land and improvements, plus about 10 per cent.

There is no other spot in the world where possibilities for carrying out, for example, the Australasian idea, are so great as right in our own commonwealth of California. We not only have the soil and the climate, which will compare more than favorably with those

of Australasia, but we have the world's greatest markets at our very door, whereas Australasia is isolated from great populated centers, thus being placed at a serious marketing disadvantage.

It is not difficult to foresee how, if suitable plans are carried out, it must revolutionize the rural conditions of California, by enabling the struggling farmer to borrow his money as cheaply as the greatest financier, giving him thirty years or less in which to make repayments.

In many instances such advantages may save many farmers from failure who find themselves on the ragged edge, and who are unable to meet their loans, by enabling them to secure their money at the world's lowest interest rate, and with many years in which to make repayment, thus greatly adding to their possibility of final success.

It will be a great day for California when these plans can be successfully carried out. It will not only be a great day for California, so far as its own prosperity is concerned, but it will also be a great day for this commonwealth, in becoming an object lesson to the sister States of our Union, who may follow, as they have in other things, the example set by our State. Thus may we not only become a blessing to ourselves, but also to the nation.

“CO-OPERATION is a word often used and often misused; sometimes carelessly used and sometimes used with intention to mislead. When used fairly it not only should imply an intention to help one another but it also implies the ability to do so. It carries with it the possession by each party of some element of strength or of service which can be helpfully joined with what the other party can contribute to the partnership. This constitutes true co-operation.”—*B. F. Yoa-kum in "The Fra."*

The Immigration Problem *in* California

By Hon. Julius Kahn

Member of Congress from California

Editor's Note: Honorable Julius Kahn possesses the distinction of having served longer as a representative to Congress than any other man from the Pacific Coast. He was elected in 1898, following six years as a member of the California Legislative Assembly, and has served continuously, with the exception of one term, to date. His resolution and active work were prime factors in securing the Exposition for San Francisco. Congressman Kahn has served on numerous Congressional committees, among which may be named those dealing with judiciary, naturalization, military, immigration, and national exposition problems. In all these departments of work he has proved highly efficient. His experience in immigration matters enables him to write with incisive understanding upon the subject. His paper will be found thoroughly interesting and of undoubted value.

THE opening of the Panama Canal to the commerce of the world will materially affect the future of California. Millions of acres of fertile and arable soil will be opened up to agriculturists and horticulturists in our productive valleys and the foothills of our great mountain ranges. This State can be made, and will be made, the world's granary. Our great extent in area from north to south and our climatic conditions enable us to produce all those food products that are so essential to the very existence as well as the pleasure of the human race. Our cereals, our vegetables, and our fruits mature many weeks before similar products ripen in the Eastern section of our country. Those consumers on the Atlantic seaboard and in the Mississippi Valley region who will be able to secure our food commodities at reasonable prices far

in advance of their own seasons will become steady customers for the products of California.

FARMERS' OPPORTUNITY

Our great difficulty heretofore has been the necessary supply of farm labor. Orientals have never found favor in the eyes of Californians. But, with the opening of the Panama Canal, many thousands of European laborers will come directly through the great waterway from their native lands to the Golden Gate. Most of these will be farmers and horticulturists. They and their ancestors for many generations have been compelled to eke out an existence on lands that have been worked for centuries and that can only be made productive by the constant use of fertilizers. These men know what intensive farming means. If they can be spread upon the

lands in the interior they will add enormously to the wealth of the Golden State. For our soil is practically virgin. Millions of acres have never been tickled by the plough as yet. They need no artificial fertilization. The farm laborers from Europe, taking advantage of these favorable conditions, will be able to gather enormous harvests. And the markets for these harvests will constantly increase.

WORK OF COMMISSION

An immigration commission already has been appointed to meet the conditions that will arise out of this tide of immigration. This commission will endeavor to prevent the congestion of these masses of immigrants in our cities. They will seek to send them back to the land. They will endeavor to induce them to take up the arts of husbandry in this commonwealth. That means that labor of the right kind will be found that will enable the owners of large holdings either to go into the business of raising crops themselves, or it will enable them to sell their great tracts to small holders who will take advantage of the labor conditions to put their farms, orchards, and vineyards under cultivation. The crops of fruits and melons and berries and vegetables will increase enormously. Our dairies, our hop fields, our cereal producing ranches, our vineyards, and our orchards will be expanded and extended until the entire State will become one vast, extensive farm. Lines of refrigerator ships will undoubtedly be established to take

these products to the markets of our Eastern seaboard and even to the ports of Europe, Asia, and South America. Today large quantities of fresh fruits and vegetables are shipped to London and other European cities in refrigerator ships from South Africa. England, and even our own country, as well as many of the large communities in the Orient receive fresh beef, fresh vegetables, and other products of the farm and dairy from Australia. Argentina is sending her farm products to our own Eastern seaboard, as well as to European countries. These exports add materially to the wealth of the exporting nations, and we in California ought to take advantage of the new conditions that will come to us through the opening of the canal to increase our trade in the products of this State with the great consuming masses of our Eastern Coast and the western coast of Europe. There is no reason why our immigration problem should become a difficult one. On the contrary, it ought to be easy of solution. In many of the smaller valleys of California, European immigrants and the sons and daughters of these immigrants have already created productive farms, dairies, orchards, and vineyards. They have taught us what can be done by the industrious immigrant on the lands of California.

The future for the interior of the State, when the tide of immigrants shall be distributed upon our uncultivated lands, holds as bright a bow of promise as ever hung upon the clouds of a retreating storm.

FOR OUT in San Francisco a panorama is beginning to unfold before us—a splendid panorama of our past and the past of those countries closely allied with us in the endeavors of civilization. We have only to stroll and watch, and we can not help drawing from it that “vision without which a people perishes.” On our way there we shall catch sight of glories of pastureland, sublimities of mountain range, the golden sight of Titan young cities of the West, the realization of that heritage the pioneers have left us. In great spaces fit for men to breathe in are born great dreams. We must necessarily return with fresher springs of inspiration opened in our souls.—*From Editorial in “The Century” for April, 1915.*



Mount Shasta, Northern California

“MOUNTAINS seem to have been built for the human race, as at once their schools and cathedrals; full of treasures of illuminated manuscript for the scholar, kindly in simple lessons for the worker, quiet in pale cloisters for the thinker, glorious in holiness for the worshiper. They are great cathedrals of the earth, with gates of rock, pavements of cloud, choirs of stream and stone, altars of snow, and vaults of purple traversed by the continual stars.”—*Ruskin*.

The Parcel Post Service in California

By Charles W. Fay

Postmaster of San Francisco

Editor's Note: The bridging of great distances and the consequent closer relationship between the remote farmer and the marts of trade as a result of the perfection of the parcel post is the subject of the following article by Charles W. Fay, postmaster of San Francisco. Mr. Fay finds in the new order of things a cause for much satisfaction, and his views will be read with interest since he is known to have always taken an active interest in public affairs. Mr. Fay was for three terms secretary to former Mayor Phelan (now senator) of San Francisco. He was appointed postmaster by President Wilson.

WHEN, two years ago, the parcel post system was added to the mail service and the United States government seriously entered the business of transporting packages, a new field of opportunity was opened, the scope and value of which are only just beginning to be realized. By its order inaugurating the parcel post system the Post Office Department placed at the disposal of the people for the handling of parcels, more than 60,000 post offices and stations, 33,000 city carriers, 45,000 rural carriers, and 1,000,000 miles of rural free delivery, and brought 20,000,000 people, who were, up to that time, out of touch with any market, directly in contact with the world of trade.

Nowhere has this new service a better field of usefulness than in California. All conditions of populous districts are present in and around the large cities, and through the avenues of the mail service these centers are brought in touch with the far distances in the forests and in the mountains. There the express service, because unprofitable, was unknown, and the monthly or even semi-annual

trip to the nearest, but still far away settlement, was the only means of getting supplies.

Now this has all been changed. No place is too lonesome to be out of reach of the post office, or too far away to be forgotten. The element of cost does not determine the character or extent of accommodation. The entire service bears the burden in the lonesome places and the same theory that will spend a dollar to send a two-cent letter through the ice fields of Alaska, will bring a parcel to some pioneer or prospector far out in the wilderness where he is blazing the trail. Service of this kind can not be done under the theory of a profit paying business, and yet in the long run it does pay, for its value is rated in citizenship and manhood and new opportunities, not in dollars and cents.

NEW OPPORTUNITIES DISCOVERED

It is in this opening up of new opportunities that the parcel post is playing the most important part. It is no longer true that a man or small merchant with goods to sell must find his market in his own vicinity. He can, through the parcel post, find it anywhere.

Under the zone system he may find that some markets are more available than others, and that some products may be unavailable at some places but available elsewhere, but if he will give the system half the study he gives to railroad and express rates and conditions he will find some part of it accurately tuned to the song of his needs, and he has only to keep in harmony.

"FARM TO CITY" SERVICE

The parcel post system gives special heed to the marketing of farm produce in the cities, and a "producer to consumer" service that, starting as an experiment, has become a firm and rapidly growing fixture in the trade of the country. And supplementing this "farm to city" service is a "city to farm" service that is swelling the volume of business handled to proportions far beyond any prophecy made when the service started. Potatoes, fruit, meat, fresh vegetables, honey, butter, eggs, dried fruit, nuts, dressed poultry, squabs, berries and a hundred other things are streaming into the city of San Francisco and other places where these "farm to table" centers have been established; and grain, cement, nails, blacksmiths' coal, flour, meal, salt, plaster, and even bricks, are going out to where no deliveries of anything have ever before been made, except through the medium of the old farm wagon.

Ore is transported by parcel post to the assay office and to the smelter. Bullion is transported from the smelter to the mint.

Gradually new fields are opening to the new service and up-to-date merchants are calling more and more upon its facilities. Yielding to their needs, rates have been lowered and weight limits have been twice raised. Books have been admitted as parcel post; printed matter also when in quantity beyond the ordinary third class package. Regulations have been amended to allow sealed packages of proprietary articles to be transmitted at parcel post rates. New methods of handling have been devised; new schemes of distribution to prevent rehandling have been thought out; insurance on small articles has been cut in half; arrangements have been made to furnish a delivery receipt to the sender and to collect the value of the package if he so desires.

GOVERNMENT'S CONCESSIONS

In every way possible the Post Office Department has been following the demands made upon the parcel post service with further concessions, in order that business needs may meet with business treatment, and a service not for one but for all, may be placed at the people's disposal.

With its varied products, its wide diversity of industries and its profusion of opportunity, California should profit largely by the parcel post. It has entered into the heart of the commercial life of the State, and day by day its hold on the situation is growing stronger. It is an element in trade that must be reckoned with, and those who first see and avail themselves of its opportunities will secure an advantage hard to overcome.

THE modern farmer sometimes scarcely realizes the advantages he has over what his forefathers had to contend with. The telegraph, telephone, automobile, and now the parcel post—all are factors in the development of the agriculturist of today. And his ability to produce is greatly increased, while he and his family no longer are veritable slaves to the soil, but masters of it, causing it to yield bountifully. California is an ideal locality for those who would farm under the best conditions.

California Coming *Into* Its Own

By Edgar Allen Forbes

*Secretary of the California Development
Board*

Editor's Note: Contrasting vividly the activities and vast production of the California of today with the California of the padres, Mr. Forbes, known nationally as a high class magazine writer and editor, paints the tremendous advancement of the State in glowing slashes of color upon his canvas of years. In his position as secretary of the California Development Board he is so placed as to be constantly in touch with what the State is doing. Therefore it is not surprising that his paper should possess the attention to detail in the matter of agricultural and other production that it does.



FROM its earliest beginnings, California has been a land of promise, but in that dreamy, romantic and at times tragic era of its history, against whose skyline stand in bold relief the padre and the conquistador, the resources of the country were untouched, its possibilities were as yet an unknown quantity. All that could be discerned by the necessarily narrowed vision of those early figures in the history of California, was that it possessed wonderful scenery, equable climate and an abundance of animal and vegetable life, with none but the aboriginal inhabitants to lay claim thereto.

The missionaries were at that time concerned more deeply with the salvation of the Indians than with the development of the land or the settlement of the province. They saw a great deal to be done for the soul of

the Indian and beheld in this their most pressing duty. But the conquistadors, lusting only for conquest and gold, regarded the Indian as simply a slightly better developed type of the beasts that haunted the forests and plains, and by a system of cruelty, amounting frequently to barbarism, forced him into slavery and soul-killing labor. So the padres found very soon more than mere soul salvation awaiting their energies. They must strive against the powers of might, the powers of wealth; the Indian's body must be saved as well. In this heart-breaking task the names of such men as Las Casas and Junipero Serra stand out strongly; it was through the efforts of these and other members of that early band of heroic missionaries that the mission idea became a fact.

The Indian was a non-tiller of the soil.

The conquistador and the cavalier of the period had neither time nor inclination for such work. True, the Indians were made to labor under the lash of the conquistadors, but it was a labor that killed and its harvest was largely stained with the blood of the toilers. The true idea of development did not come into being until the missions were founded and brought to a flourishing state. Twenty-one missions were built up in less than seventy years, and the value of the property acquired by the thrifty padres, represented by land, harvest, and flocks, mounted into the millions of dollars. Then came Mexico's revolt from Spain in 1821 and with this successful insurrection began the "secularization" of the missions. The Indians were given their freedom and land and stock, which they promptly proceeded to lose by gambling or through their natural disinclination to labor. The mission system was demoralized and dismembered, and though a few friars stayed on, doing what lay in their power for the unfortunate Indians, the end was inevitable. The march of progress had destroyed forever the system that had been in vogue nearly two-thirds of a century. And before the triumphant advance of this same progress went down alike padre, Indian and cavalier, destined henceforth to flourish only in memory and in the pages of history or romance.

THE GLEAM OF GOLD

The agricultural possibilities of California may have been recognized to some extent by the Franciscans and some occasional isolated conquistador, but before they should be realized to any great extent another source of riches was to be uncovered. From the uttermost ends of the earth, lured by the gleam of nuggets in the placer fields and by the excitement of an unknown life in "the new and naked lands," came the gold-seekers. The excitement they found, many found "pay dirt" as well; others found only failure and ignominious death. And the total cost of production (reckoned in expense, time, toil and suffering) was out of all proportion to the number of ounces of gold. And so the Forty-Niner retraced his steps along the Via Dolor-

osa, leaving behind him a region which, sixty-five years later, is still the richest gold-producing state in the Union.

Prior to the coming of the gold-hunters and following the eventful period of the padres, was an Arcadian interlude, when the plains became dotted with haciendas and the hills and valleys were the abodes of great flocks and herds—the days of the Spanish grants, of the grandees; days of chivalry when "softly sighed of love the light guitar." Following on the heels of this pastoral era was the Mexican period, and then the immigrant trains began to wend their circuitous and tortuous way across the great plains and the fame of California was spread abroad. The "prairie schooners" brought to the new land many whose names are inseparably linked with its history—such names as Bidwell, Sutter, Donner, Fremont, and others.

In seeking a location suitable for the erection of a flour mill which Captain Sutter wished to build, James W. Marshall uncovered gold and by this simple act transformed the country into a gigantic lodestone that was to attract countless thousands to its shores. Already the American flag was floating over the Monterey customs house, as well as Sonoma, Los Angeles, San Francisco. Two years later this flag had a new star and California, having passed through many hands and numberless vicissitudes, had become safely anchored at last.

Had men not been blinded by the lustre of the yellow metal in those days, it is conceivable they might have given more attention to the other possibilities of the soil. But this was hardly to be expected; where gold lay beneath their feet, though sometimes eluding even their most ardent search, it was scarcely likely they should be content to sow and wait upon nature to produce a crop that they might harvest. These men, many of them, were farmers—had left farms to search for gold. But while they must have realized what opportunities lay before them in agricultural lines, the immediate prospect for gold discovery was too powerful a magnet. Even where fortune passed them by they refused to till the soil.

Witness the case of one sturdy young farmer who came from the worn-out soil of one of the Southern states to seek wealth in the new goldfield. He had to undergo months of hardship before he could sink a pick into the creek bed of a California placer field. He came, he toiled, grimly endured the hardships incident to the pioneer life; then he went back empty handed to his people. Today we know he might have remained as the absolute owner of a large part of the San Joaquin Valley or of the area now covered by the city of Los Angeles!

The overland stage, the pony express, then the railroads, each aiding in the development of the new State, were coincident with the agricultural awakening that began while yet the gold fever held sway. First came the great cattle era, then its decline and the rise of the grain, the apotheosis of the wheat, and its fall—and then the breaking up of the vast domains and the cropping forth of the smaller ranches, and farms, the orchards, vineyards, gardens. There are still, in our present day, great live stock ranches; there are fields of golden grain apparently without end—but the days of the wheat and cattle barons are gone forever. This is the day of the farmer, and already the spirit of co-operation is making itself felt in contradistinction to the monopolistic methods of those earlier times.

CONTRASTING FIGURES

Sixty-five years ago the cash value of all the farms of California as entered in the records of the Eighth Census, was but \$3,874,401. There are numerous individual holdings in this State today that could not be bought for that amount. In that same period there were 4780 "working oxen" in California, the number increasing in the next decade to a total of 31,527. A "working ox" would be a curio today to most Californians, but the motor vehicle registration in California in 1914 included 122,800 entries.

The orchard products of California were then listed at a total valuation of \$17,700; now they are figured not in dollars but in carloads. For example, in 1913 the shipments of oranges and lemons alone amounted

to 18,085 cars—more than a car for every dollar's worth of all the orchard products of 1850. The wine makers of that generation considered it something of an achievement to report the manufacture of 58,055 gallons of wine, but the State board of viticultural commissioners reports that the 1914 output was "slightly under 40,000,000 gallons," not counting 3,320,744 gallons of brandy and perhaps 50,000 gallons of unfermented grape juice. Thus, by comparisons, an idea of the tremendous development of California's resources can be gained.

There is small need for any one to lament the vanished days of the discoverer and the explorer. California is still in the epoch of discovery and every year records new marvels in agriculture and horticulture. It is generally understood that the citrus industry thrives in California. Yet the navel orange, the chief factor of this industry, was introduced from Brazil as recently as 1870, and the first crop of seedless oranges (sixteen in number) ever grown in North America came from two trees in 1878-9. A crop of six million boxes a year is not considered remarkable today.

Despite the fact that the grape was grown in the mission gardens by the Franciscan friars, the wine industry does not actually date back beyond the memory of men now living. The same is true of the raisin industry, which is even younger, and of the English walnut, which though it now has a production in California of from eight to twelve thousand tons annually, has been grown in California for less than half a century, and the two men who had most to do with the creation of the industry in California are still living.

An atmosphere of romance surrounds most of these products, but they have arrived at their full fruition largely within comparatively recent times and as the result of practical methods of cultivation.

NEW DISCOVERIES

Every once in a while some new discovery awakens a county or section of the State to the realization that its resources have not yet been exhausted, and that opportunity is for-

ever present for those who do not bar their doors against it.

One of the more recent surprises has been the Imperial Valley, which has developed into a "cotton belt" that promises to rival those districts of the South which had long held the supposedly exclusive control over this industry.

Such illustrations might be indefinitely multiplied, evidence of the fact that California has not yet come into its own, but is simply on the way.

STRIKING DATA

The following items of fact concerning production in this and last year are significant:

The total number of cars of citrus fruits from the State was 47,839 cars for the season November 1, 1913, to October 19, 1914. The total number of cars of deciduous fruits up to October 21 was 14,301 $\frac{3}{4}$, as against 11,946 $\frac{1}{2}$ cars same period in 1913.—October, 1914.

The total pack of California canned fruits for 1914 is estimated at about 5,500,000 cases of the market value of about \$15,000,000. The total canned vegetable pack is estimated at about 3,000,000 cases; approximate value \$6,000,000.—December, 1914.

Approximately 12,000 carloads of vegetables were shipped out of the State during 1914, the largest amounts being of potatoes, onions and celery.—December, 1914.

The lima bean crop for 1914 is estimated at 1,550,000 bags of eighty pounds each.—November, 1914.

In 1914 the yield of rice per acre in California rice fields was 53.3 bushels. The yield per acre of California's nearest competitor was 39.8 bushels. California is given fourth

rank in the production of rice in the United States.—January, 1915.

Seventy-three thousand dollars was paid to dairymen of Fresno County for June butter fat.—July, 1914.

It is reported that 6,650,000 pounds of butter was produced in 1914 from 32,000 cows in the Imperial Valley.—February, 1915.

These are fairly representative items and it may be truthfully said that practically every county in the State is able to furnish without difficulty figures fully as impressive regarding some sort of product.

California offers a diversity of climatic and soil conditions unparalleled in any other state; between Del Norte County (on the Oregon frontier) and Imperial County (on the Mexican border) stretch over eight hundred miles, wherein can be found scenery, climate and soil in greater variety than in any other 153,650 square miles of territory under the American flag. Here may be found any altitude from the line of perpetual snow to the plain that drops below the level of the sea; any degree of humidity, any temperature, any sort of landscape, any kind of vegetation.

California, as it has been the endeavor to show herein, has from the beginning supplied man with everything he needed for his own comfort and where he has had the energy and enterprise to labor honestly, has responded richly to his efforts. And if romance has suffered, industry has gained by the growth of civilization. The past, with its picturesqueness, need not be regretted. The golden opportunity of the Now is more alluring than any which beckoned men in the old days.

California is at last coming into its own, facing "that God's own hour—when a new horizon heaves itself up against a new dawn."

“THE settlement of the West has only begun. It will easily be possible to support a population five times as great as that now found there. Climatic conditions are favorable; health conditions are good; the splendid class of pioneers who settled the West have built up social and political institutions which are attractive to thinking people.”—*Thomas H. Means in "The Economist."*

Fundamental Principles of Plant Breeding

By Luther Burbank

President of the Luther Burbank Society

Editor's Note: Many years of devotion to the study of the principles of plant life have placed Mr. Luther Burbank in a unique position whereby he has been enabled to combine a labor for beauty and for utility in the development, transformation, and creation of forms of fruits, vegetables, and flowers, achieving a success thereby that makes his name one to conjure with in the realms of horticultural research and experiment. The genius of Luther Burbank, coupled with the rich soil and balmy air of California, have united in bringing to the world added riches to appeal to palate and eye. In the following article Mr. Burbank treats of the fundamental principles of plant breeding in a highly interesting manner.

THE fundamental principles of plant breeding are simple, and may be stated in few words; the practical application of these principles demands the highest and most refined efforts of which the mind of man is capable, and no line of mental effort promises more for the elevation, advancement, prosperity, and happiness of the whole human race.

Every plant, animal, and planet occupies its place in the order of nature by the action of two forces—the inherent constitutional life force with all its acquired habits, the sum of which is heredity; and the numerous complicated external forces or environment. To guide the interaction of these two forces, both of which are only different expressions of the one eternal force, is, and must be, the sole object of the breeder, whether of plants or animals.

When we look about us on the plants inhabiting the earth with ourselves, and watch

any species day by day, we are unable to see any change in some of them. During a lifetime, and in some cases perhaps including the full breadth of human history, no remarkable change seems to have occurred. And yet there is not today one plant species which has not undergone great, and to a certain extent, constant change.

The life forces of the plant in endeavoring to harmonize and adapt the action of its acquired tendencies to its surroundings may, through many generations, slowly adapt itself to the necessities of existence, yet these same accrued forces may also produce sudden, and to one not acquainted with its past history, most surprising and unaccountable changes of character. The very existence of the higher orders of plants which now inhabit the earth has been secured to them only by their power of adaptation to crossings, for through the variations produced by the combination of numerous tendencies, individuals are produced

which are better endowed to meet the prevailing conditions of life. Thus to nature's persistence in crossing do we owe all that earth now produces in man, animals, or plants; and this magnificently stupendous fact may also be safely carried into the domain of chemistry as well, for what is common air and water but nature's earlier efforts in that line, and our nourishing foods but the result of myriad complex chemical affinities of later date?

Natural and artificial crossing and hybridization are among the principal remote causes of nearly all otherwise perplexing or unaccountable sports and strange modifications, and also of many of the now well established species. Variations, without immediate antecedent crossing occur always and everywhere from a combination of past crossings and environments, for potential adaptations often exist through generations without becoming actual, and when we fully grasp these facts there is nothing mysterious in the sudden appearance of sports; but still further intelligent crossings produce more immediate results and of great value, not to the plant in its struggle with natural forces, but to man, by conserving and guiding its life forces to supply him with food, clothing, and innumerable other luxuries and necessities. Plant life is so common that one rarely stops to think how utterly dependent we are upon the quiet, but magnificently powerful work which they are constantly performing for us.

It was once thought that plants varied within the so-called species but very little, and that true species never varied. We have more lately discovered that no two plants are ever exactly alike, each one having its own individuality, and that new varieties having endowments of priceless value, and even distinct new species, can be produced by the plant breeder with the same precision that machinery for locomotion and other useful purposes is produced by the mechanic.

ADJUSTING TO CONDITIONS

The evolution and all the variations of plants are simply the means which they employ in adjusting themselves to external conditions.

Each plant strives to adapt itself to environment with as little demand upon its forces as possible and still keep up in the race. The best endowed species and individuals win the prize, and by variation as well as persistence. The constantly varying external forces to which all life is everywhere subjected demand that the inherent internal force shall always be ready to adapt itself or perish.

The combination and interaction of these innumerable forces embraced in heredity and environment, have given us all our bewildering species and varieties, none of which ever did or ever will remain constant, for the inherent life force must be pliable or outside forces will sooner or later extinguish it. Thus adaptability, as well as perseverance, is one of the prime virtues in plant as in human life.

Plant breeding is the intelligent application of the forces of the human mind in guiding the inherent life forces into useful directions by crossing to make perturbations or variations and new combinations of these forces, and by radically changing environments, both of which produce somewhat similar results, thus giving a broader field for selection, which again is simply the persistent application of mental force to guide and fix the perturbed life forces in the desired channels.

Plant breeding is in its earliest infancy. Its possibilities, and even its fundamental principles, are understood but by few; in the past it has been mostly dabbling with tremendous forces, which have been only partially appreciated, and it has yet to approach the precision which we expect in the handling of steam or electricity, and, notwithstanding the occasional sneers of the ignorant, these silent forces embodied in plant life have yet a part to play in the regeneration of the race which by comparison will dwarf into insignificance the services which steam and electricity have so far given. Even unconscious or half conscious plant breeding has been one of the greatest forces in the elevation of the race. The chemist, the mechanic have, so to speak, domesticated some of the forces of nature, but the plant breeder is now learning to guide even

the creative forces into new and useful channels. This knowledge is a most priceless legacy, making clear the way for some of the greatest benefits which man has ever received from any source by the study of nature.

A general knowledge of the relations and affinities of plants will not be a sufficient equipment for the successful plant breeder. He must be a skillful botanist and biologist, and having a definite plan, must be able to correctly estimate the action of the two fundamental forces, inherent and external, which he would guide.

The main object of crossing genera, species, or varieties is to combine various individual tendencies, thus producing a state of perturbation or partial antagonism by which these tendencies are, in later generations, dissociated and recombined in new proportions, which gives the breeder a wider field for selection; but this opens a much more difficult one—the selection and fixing of the desired new types from the mass of heterogeneous tendencies produced, for, by crossing, bad traits as well as good are always brought forth. The results now secured by the breeder will be in proportion to the accuracy and intensity of selection, and the length of time they are applied. By these means the best of fruits, grains, nuts, and flowers are capable of still further improvements in ways which to the thoughtless often seem unnecessary, irrelevant, or impossible.

When we capture and domesticate the various plants, the life forces are relieved from many of the hardships of an unprotected wild condition, and have more leisure, so to speak, or, in other words, more surplus force, to be guided by the hand of man under the new environments into all the useful and beautiful new forms which are constantly appearing under cultivation, crossing, and selection. Some plants are very much more pliable than others, as the breeder soon learns. Plants having numerous representatives in various parts of the earth generally possess this adaptability in a much higher degree than the monotypic species, for having been subjected to great variations of soil, climate, and other influ-

ences, their continued existence has been secured only by the inherent habits which adaptation demanded, while the monotypic species not being able to fit themselves for their surroundings without a too radically expensive change, have continued to exist only under certain special conditions. Thus two important advantages are secured to the breeder who selects from the genera having numerous species—the advantage of natural pliability, and in the numerous species to work upon by combination for still further variations.

CARE IN SELECTION NECESSARY

The plant breeder before making combinations should with great care select the individual plants which seem best adapted to his purpose, as by this course many years of experiment and much needless expense will be avoided. The differences in the individuals which the plant breeder has to work upon are sometimes extremely slight. The ordinary unpracticed person can not by any possibility discover the exceedingly minute variations in form, size, color, fragrance, precocity, and a thousand other characters which the practiced breeder perceives by a lightning like glance. The work is not easy, requiring an exceedingly keen perception of minute differences, great practice, and extreme care in treating the organisms operated upon, and even with all the naturally acquired variations added to those secured by scientific crossing and numerous other means the careful accumulation of slight individual differences through many generations is imperative, after which several generations are often, but not always, necessary to thoroughly "fix" the desired type for all practical purposes.

The above applies to annuals, or those plants generally reproduced by seed. The breeder of plants which can be reproduced by division has great advantage, for any valuable individual variation can be multiplied to any extent desired without the extreme care necessary in fixing by linear breeding the one which must be reproduced by seed. But even in breeding perennials the first deviations from the original form are often almost unappreciable to the

perception, but by accumulating the most minute differences through many generations the deviation from the original form is often astounding. Thus by careful and intelligent breeding any peculiarity may be made permanent, and valid new species are at times produced by the art of the breeder, and there is no known limit to the improvement of plants by education, breeding, and selection.

The plant breeder is an explorer into the infinite. His brain must be clear and alert in throwing aside fossil ideas and rapidly replacing them with living, throbbing thought followed by action. Then, and not until then, shall he create marvels of beauty and value in new expressions of materialized force, for everything of value must be produced by the intelligent application of the forces of nature which are always awaiting our commands.

The vast possibilities of plant breeding can hardly be estimated. It would not be difficult for one man to breed a new rye, wheat, barley, oats, or rice which would produce one grain more to each head, or a corn which would produce an extra kernel to each ear, another potato to each plant, or an apple, plum, orange, or nut to each tree.

What would be the result? In five staples only in the United States alone the inexhaustible forces of nature would produce annually, without effort and without cost, 5,200,000 extra bushels of corn, 15,000,000 extra bushels of wheat, 20,000,000 extra bushels of oats, 1,500,000 extra bushels of barley, 21,000,000 extra bushels of potatoes.

But these vast possibilities are not alone for one year, or for our own time or race, but are beneficent legacies for every man, woman, and child who shall ever inhabit the earth. And who can estimate the elevating and refining influences and moral value of flowers with all their graceful forms and bewitching shades

and combinations of colors and exquisitely varied perfumes? These silent influences are unconsciously felt even by those who do not appreciate them consciously, and thus with better and still better fruits, nuts, grains, and flowers will the earth be transformed, man's thoughts turned from the base, destructive forces into the nobler productive ones which will lift him to higher planes of action toward that happy day when man shall offer his brother man, not bullets and bayonets, but richer grains, better fruits, and fairer flowers.

Cultivation and care may help plants to do better work temporarily, but by breeding, plants may be brought into existence which will do better work always in all places and for all time. Plants are to be produced which will perform their appointed work better, quicker, and with the utmost precision.

Science sees better grains, nuts, fruits, and vegetables, all in new forms, sizes, colors, and flavors, with more nutrients and less waste, and with every injurious and poisonous quality eliminated, and with power to resist sun, wind, rain, frost, and destructive fungus and insect pests; fruits without stones, seeds, or spines; better fiber, coffee, tea, spice, rubber, oil, paper, and timber trees, and sugar, starch, color, and perfume plants.

Every one of these, and ten thousand more, are within the reach of the most ordinary skill in plant breeding.

Fellow plant breeders, this is our work. On us now rests one of the next great world movements, the guidance of the creative forces are in our hands.

Man is slowly learning that he, too, may guide the same forces which have been through all the ages performing this beneficent work which he sees everywhere above, beneath, and around him in the vast teeming animal and plant life of the world.

MY GARDEN, with its silence and the pulses of fragrance that come and go on the airy undulations, affects me like sweet music. Care stops at the gates, and gazes at me wistfully through the bars. Among my flowers and trees Nature takes me into her own hands and I breathe freely as the first man.—*Alexander Smith.*

Modern City Building

By Timothy A. Reardon

President San Francisco Board of Public Works

Editor's Note: As one who has had superior opportunities for noting the processes of evolution in the development of the marts of men, Mr. Timothy A. Reardon has profited thereby to such an extent that he has been enabled to put to practical use many of the ideas thus gained. His article points the way for an escape from the sordid in city building and to something approaching an attainable ideal. Mr. Reardon sees the city with a broad vision from a vantage point and with a wholesome regard for the rights of the multitude as opposed to those of the few and favored.

IT SHOULD not be proverbial that "God made the country and man made the town." Therefore, it is incumbent upon those who have a part in the building of our cities of today to exert their efforts toward making them as nearly perfect as possible; as nearly as possible free from those objectionable features that have long been supposed inseparable from man-made habitations.

Two things go toward the ultimate perfection of any work that concerns the building of the ideal city: First, the right kind of citizens, and, second, the right kind of motives.

It is self-evident that it would be hopeless to attempt the construction of a secure suspension-bridge from imperfect material; no more can you build a city with unprincipled or utterly selfish citizens. It is likewise apparent that if a man sets out to do a thing, no matter how laudable his enterprise on the face of it, if he proceeds with a mental reservation that he will in the end turn it to his own selfish account, the work can not prosper; or, if it should appear to do so, must ultimately decay because rotten at the core. To repair the damage ere too late, it is necessary to detect the infection and destroy it. In short, right

motives are as necessary as right materials, and neither can hope for lasting success without the other.

Granted the above prerequisites to success, it generally follows that a city builder, or builders, since it always requires more than one head or one pair of hands to accomplish a work of any magnitude, must be provided with financial backing, certain natural advantages, and space wherein to work. From what has been accomplished in the way of city building in some parts of the country, however, it would seem that the matter of natural advantages is not always essential. Cities have been builded under what in the beginning must have seemed almost insurmountable obstacles. In the West, in California particularly, there is little need of considering this, or even the question of room, and financial aid is usually provided without much effort.

Perhaps the better word to express what is aimed at in this paper, would be "rebuilding" instead of building, since, it is scarcely necessary to say, few, if any, cities are perfect, and their rebuilding, reconstruction, in fact, offers unparalleled opportunities for the city builder to show by comparison the advantages of modern methods over those of the past.

The most approved modern idea in the construction of the municipal heart of the city of importance is the "civic center" plan. The grouping, or assembling of the civic structures and the provision thereby of conveniences otherwise unattainable, is of undoubted advantage. Likewise, the efforts at symmetry or classical outline in the construction of the buildings themselves and of the surrounding grounds, are highly commendable. One of the sins of the early city builder was ugliness and lack of uniformity in construction. But, while it may be comparatively easy for the administrative bodies to create civic centers composed of buildings that harmonize, it is a far more difficult matter to secure anything like harmony or symmetry in the city generally, either in the business or residential districts. Apparently the only safe plan henceforth, in the erection of buildings of any magnitude, will be to follow certain classic models, so thoroughly established as standards of perfection in both contour and utility as to prove, in all likelihood, equally acceptable to future generations. Perhaps wise lawmakers in days to come will provide measures to insure some such recognition of the laws of harmony and thereby materially enhance the future aspect of the cities.

UPWARD TENDENCY

Whether a city be constructed upon comparatively small area as in the case of some of the Eastern municipalities, or with room to spread as in most Western instances, the modern tendency seems to be upward; hence, the skyscraper, undoubtedly the outcome of the necessity of conserving land space and gaining as much as possible in height to offset the fabulous values of city property in the business districts. And yet, the skyscraper will be found in cities where there is no physical need for it, so it must be assumed that it is a type of office building which experience has proved desirable, despite any apparent drawbacks or qualities of unsafety, now largely minimized by excellence of construction and perfection of equipment for escaping and fighting fire, etc.

Perhaps the chief feature that has endeared

the skyscraper to the constructor of city buildings, after the matter of conservation in ground space, has been the compactness and resultant saving in cost and time to tenants and owners alike. The ultimate of this is attained in certain Eastern structures, wherein, it is said, a man might spend a lifetime if need be, finding within the confines of the building all the necessities of life. This however, is a custom it is to be hoped will never become prevalent, else we are likely to degenerate into a race of human moles, spending an artificial existence and forgetting the sunshine and the blue sky.

The "city-beautiful" movement, which has gained favor in numerous quarters, has much to recommend it, providing the idea is not carried to impracticable limits. Certainly the beautifying of a city in a dignified and practical manner, and the retention of city squares and parks, with lawns and shade trees, is highly commendable.

We of the West have much to be thankful for, whether our lot be cast in city or country, since we are always in touch with both. Thus the residents of San Francisco may with a short ride find themselves in the most delightful of natural surroundings, such as the San Mateo county slopes and hills, or, by crossing the water, the numerous charming environs of the east bay cities. The same applies to the southern part of the State, where the numerous attractive beach resorts afford tempting opportunities for relaxation for the people of the city.

So, with the interior cities and larger towns—everywhere the country beckons. Indeed, there are few cities in our land where the citizen may not, without a great deal of time or expense, find natural settings to satisfy his most sylvan mood. It is only the very poor in some of the greater Eastern cities who find it impossible to escape even for a time, the narrow confines of stone walls and the dismal vistas of cobbled streets, and the energies of those more fortunately situated should be exerted in their behalf, until such a thing as compulsory continuity of city life is no longer possible under any circumstances or in any part of the United States.

San Francisco, during the present year is host to the world, and the department of public works, under whose supervision most of the details of civic improvement are handled, has exerted every effort to place the city in the best possible condition to receive the throngs attracted West by the expositions.

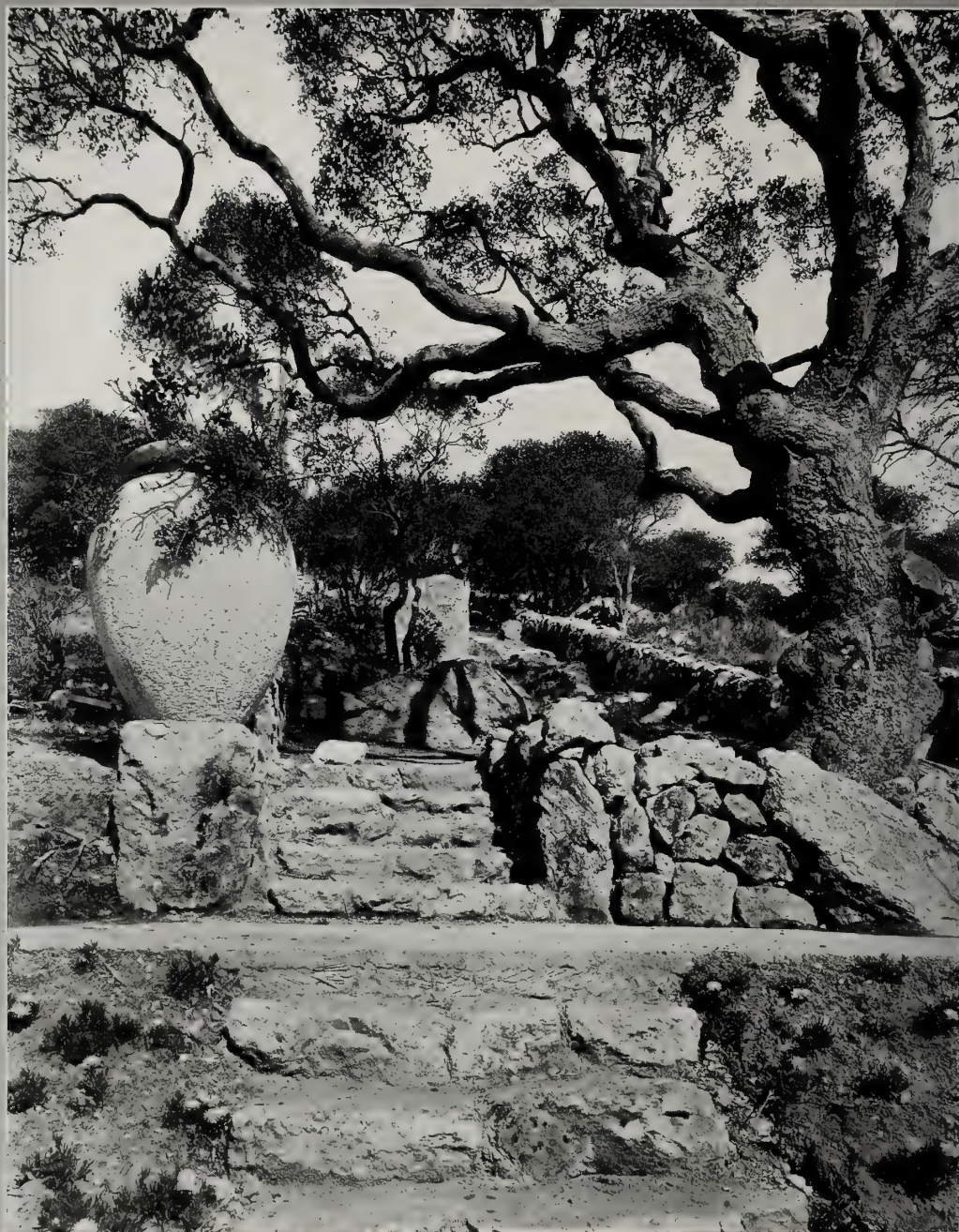
Besides the realization of the first of San Francisco's great tunnel projects and the commencement of construction on the Twin Peaks tunnel, the development of the civic center grounds and buildings, the construction of a road to the Hetch Hetchy damsite, and the extension of the lines of the Municipal Railway, the board has effected the improvement of 453 blocks of streets and of 89 crossings and intersections during the past calendar year. In addition, the streets or sidewalks fronting 111 parcels of city property have been improved. Modern equipment in the corporation yard for street repair and construction has been installed. A tremendous amount of sewerage work has been accomplished. Among noteworthy improvements planned or under way may be noted the further extension of street railways on the municipal lines; a fire alarm central station, second to none in the United States, now practically

completed; equipment of schools with metallic fire escapes; an addition to the polytechnic high school; the permanent improvement or construction of numerous extensive boulevards, etc.

THE LARGER WORD

San Francisco as a city has retained its individuality, its character, throughout many vicissitudes, and this is mainly due to the character of its citizens. While a great percentage of the crowds which throng the streets is transient, particularly at this time, owing to the exposition, and while the city is thoroughly cosmopolitan at all times, as any seaport must inevitably be, there is still persistent in the main body of the population that *spirit*, which has been handed down from father to son, since the days of the Argonauts; an indomitable spirit; unquenchable, distinctive, in a word, San Franciscan. But there is a larger word, and with that broadness of view that is one of their chief characteristics, the San Franciscans will admit it readily. This word has come to mean more with every passing day; it is representative, comprehensive, inclusive; it discourages selfishness and pettiness and inspires the spirit of brotherhood which is so necessary to progress. That word is—CALIFORNIA!

“THE highest faculty of mind is the constructive faculty—the faculty that builds. A man who builds an industry must be a strong man. The man that builds is not to be feared. He is helping to organize the world for our benefit, and he is keeping our building faculties in practice. The trouble with the old and narrower culture was that it was receptive rather than constructive. . . . The cultivated man in a perfected, democratic, industrial life will be the most widely and sanely cultivated man that has been evolved.”—*W. H. Page.*



DOES this appeal to you as a charming and effective site for a modern hillside home? There are many such locations in California; restricted subdivisions for homeseekers who desire something distinctive as a dwelling place.

California as a Place of Homes

By Mark Daniels

Landscape Engineer and Superintendent of National Parks of California

HOWEVER slightly the sense of the artistic may obtain in the individual nature, or appreciation of the beautiful enter into the individual's concept of what is essential to life and happiness, in some degree he is conscious of a sensation when the word "home" is considered that lifts it above ordinary terms and in his mental vision enshrines it as something more splendid than the average.

There are men and women, too, who, yielding to the strange fever known as *wanderlust*, boast that wherever they hang their hats is home to them. But, back in some cloistered chamber of their hearts, it is safe to say, dwells a memory centering about the word "home." They think they have forgotten, these birds of passage, but they have not.

There are persons whose souls are apparently so steeped in selfishness, or whose lives are so entirely devoted to the pursuit of material wealth and power that the thought of home as anything other than a place in which to sleep, has to all appearances, no significance. But when the pot of gold at the rainbow's end is found empty and the fruits of fame turn to apples of Sodom, in that hour shall memory carry them back over the years to a place, however humble, that once held for them all they knew of home.

Fortunately, with the great majority of us, home is perhaps paramount in our visions of earthly bliss, and the more beautiful we make our homes the more beautiful will be our lives, the more wholesome our outlook upon the world, and the less apt will we be to allow our minds to become possessed of unhallowed

thoughts. Where our treasure is there will our hearts be also; therefore it is our duty to make our home the receptacle of our treasure and no man who is not a miser will hide his treasure in a hovel. Gradually even those whose station in life makes it impossible for them to be the possessors of splendid dwellings in the midst of roomy grounds, are finding ways and means to escape the sordidness of the tenements for the suburbs and the vine thatched cottages.

Particularly is this true of the West—of California especially—where an hour's ride and frequently a much shorter one, will bring us from the city to the country the transition being rendered less arduous and expensive with each new development in transportation.

It is with members of that class, however, who are so fortunately situated as to be able to afford at least comparatively spacious grounds and buildings in proportion, and who can choose the location of their homes with an eye to the natural scenic investiture, that I would deal in this paper.

UNADULTERATED BEAUTY OF CALIFORNIA

In the beginning I may say that nowhere else in the United States and in few places in the entire world, is there to be found such unadulterated beauty and diversity of scenery, such opportunities for possibilities in architecture or landscape gardening as in California. But it is only within comparatively recent times that the most effectual means of accomplishing what I may term the ultimate in picturesque home construction has been taken into account in this State; by this I



A graceful curve in a California subdivision for homes

mean the restricted district composed of a number of units or miniature estates, all of which, however, form a complete and harmonious whole. These miniature estates may vary in size from five to forty acres and in some cases even less than five acres, the extent of the entire district so treated depending upon the sizes of its units. And in this regard, California is favored above most other states in that it has not only room, but room so situated as to be suitable in every respect for the purpose of home making.

A RIVAL OF PARIS

Take the city of San Francisco and its environs, for example, and consider from the viewpoint of the landscape architect its possibilities for the creation of idyllic homes and gardens. If Italy possessed such possibilities we would be crossing the ocean in droves to visit it. There is no place on the Atlantic Coast of this country and not more than three localities in the Old World that even compare with it. North, south, east, or west, it matters

not, the eye is favored with a vista that teems with suggestive possibilities. Go down the peninsula to where the lakes belonging to the Spring Valley Water Company are spread in a chain of tiny lagoons rivaling the famed Lakes of Killarney or the "lochs" of Scotland. Already several fine subdivisions have been laid out in that vicinity and partake of an Old World charm that is beautiful beyond compare. Journey to Marin County's slopes, and wade knee-deep in fern, while tall trees rise to imposing heights above your head. There are valleys—hill slopes—wooded dells, rivaling anything that Europe's most famous beauty spots can afford. Cross over to Piedmont, Berkeley, Northbrae, Thousand Oaks, and there you will find foot hill sites with wonderful panoramic marine views that will hold you spellbound by their enchantment. Out beyond Twin Peaks you will find Forest Hill, St. Francis Wood, and other subdivisions which provide the most ideal locations. In short, San Francisco is like Paris—surrounded

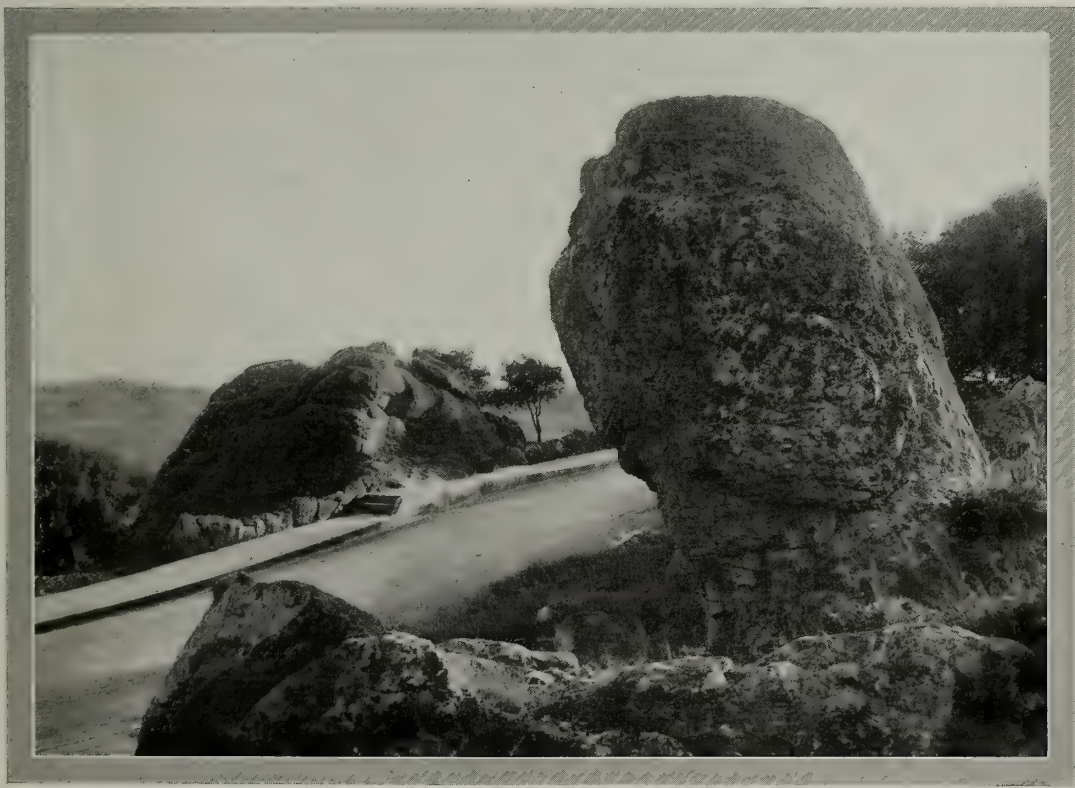
by small cities, each with its own particular style of charm, all within easy distance of the metropolis, and contributing to the general beauty and utility of the entire scheme. It is a wheel within a wheel, so to speak, San Francisco constituting the hub. This is but one example—the State, from one end to the other, affords similar facilities for those who are alive to the artistic possibilities. In the South, Los Angeles forms another hub, with spokes reaching out in all directions, the ocean on one hand, the desert and the mountains on the other, compassing the circle. In the interior there is no county but offers individual advantages, with mountain and valley scenery, crystal lakes, and rushing rivers, towering crags down which pour foamy cascades, trees that seem to touch the stars, or that, giving their growth to breadth rather than to height, spread their branches in grateful shade.

Wherever conditions seem at all propitious the restricted district idea of subdivision seems to be laying hold of those who make a busi-

ness of turning natural beauty to practical ends in forming home sites for persons of refined taste. The possibility of building a fine home and in a year or two having a soap factory or laundry erected within a stone's throw, was not to be considered. Therefore the restrictions for upwards of thirty years, insuring only buildings of a uniform excellence, barring business establishments, and making easy the minds of those who invest rather heavily in home construction.

ART THAT IS CONCEALED

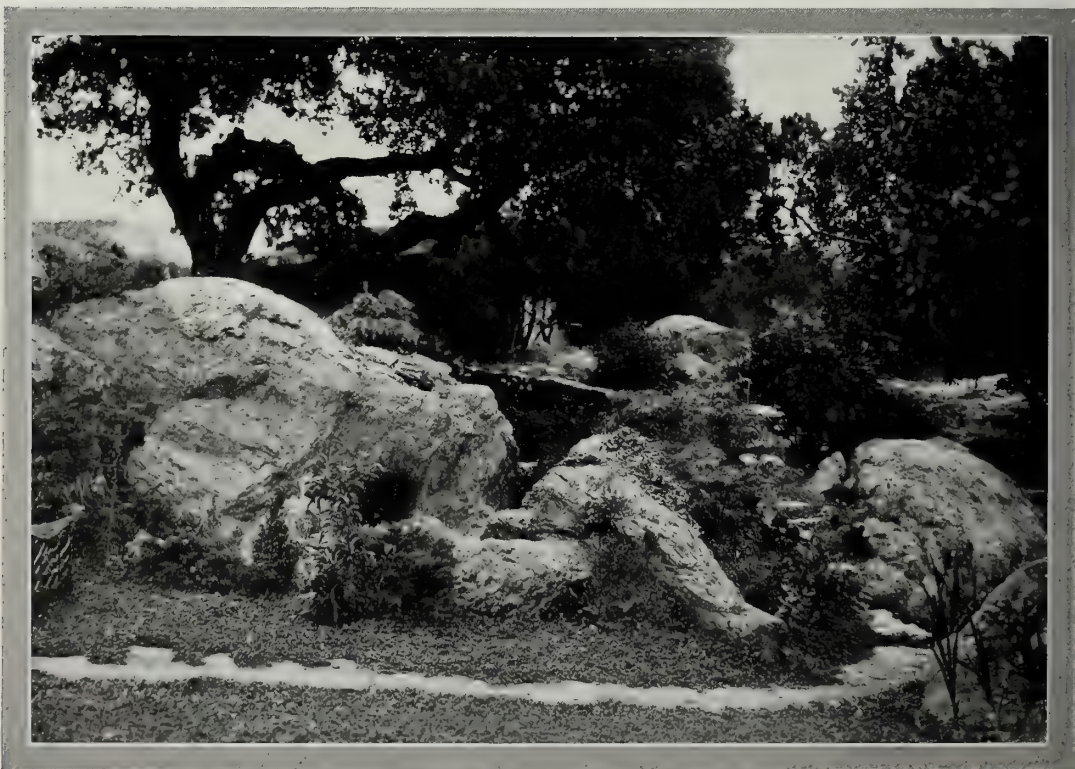
The art of the landscape architect consists more in knowing what not to do than what to do. In other words, he must seek to retain the natural effects of the setting and, where changes are essential to utility, to disguise man's handiwork as much as possible. It is merely obedience to the familiar rule—"true art is to conceal art." When, therefore, the artist in large effects wishes to decide upon the proper preparation of a certain area he must first gain a broad conception, a perspect-



Delicate piece of landscape engineering—fitting a road between two enormous boulders



R. C. Newell's picturesque home in Thousand Oaks, California, an environ of San Francisco



Grounds of Mark Daniels' home in Thousand Oaks



A home buried by feathery trees

ive view taking into consideration all the distinct features—vista, character of verdure, topographical conditions, water effects, etc. Then he must gaze with half-closed eyes upon the ensemble, finally fixing in his mind the best means of turning to advantage what nature has provided for his use. Consider a spot upon the slope of the foothills, where the ground is rendered unavailable for agricultural pursuits by the steep inclines or by the frequent outcroppings of rock, but where gnarled oaks spread their distorted branches and serpent like roots on every hand. Here is an ideal location for the landscape architect and one need only glance at some of the accompanying photographs to see what has been done with just this sort of material.

Follow California's wonderful coast line and innumerable opportunities for home sites within sight and sound of the sea may be noted.

No one with an appreciation of the beautiful can travel for one day in California and remain unenthusiastic. And when twilight comes

stand at the summit of a hill, "knee deep in June" and look out to where the sun has turned the sea into a shimmering copper shield. Watch a little golden ship sailing out through the Golden Gate and while watching see the gold change to brown and purple as night falls—and there will be inspiration and to spare for whatever work one may be engaged upon.

It is not on record that Edgar Allen Poe ever visited California but one may be excused for wondering how, even with the imaginative genius he possessed he was able to compose that masterpiece of descriptive writing, "The Domain of Arnheim," without having first seen the beauties of this State. There are a dozen places where the fabled domain might



A classic pathway that might be situated in an Old World suburb but which is typical of some of California's fine subdivisions



What finer setting for childhood's development, for instilling only ideals of beauty, and appreciation of Nature's bountifulness than this sylvan scene—a California wooded hillside turned into a place of homes

have been located. No dream of Arcadian poet surpasses the pastoral beauty of California's woods and fields; nowhere has the Great Artist painted with more daring sweeps of color than here, where the sun dies in a bed of crimson and gold, and nowhere is there a greater peace when

The azure curtain of God's house
Draws back, and hangs star-pinned in space.

One may not dwell upon this subject without falling into the mood poetic. And every nail that is driven into a typical California home, wherein beauty and service commingle; every spadeful of earth that is turned, every seed that is planted bears witness to the same spirit of appreciation. In short, one can not be a

part of the great work that is rapidly turning to account every portion of this Western land without being inspired by its qualities of enduring beauty.

FLORAL EFFECTS

Where it is necessary or advisable to add to the natural floral effects of any particular locality, the garden expert finds no difficulty in making anything grow in California that will grow anywhere else in the world. The possibilities of flowers and shrubbery as a means of accentuating or enhancing any favored spot are too patent to need an extended survey. Properly cultivated, successions of blooms may keep a garden in perpetual blossom throughout all seasons.

A recent writer in "House and Garden" says:

"For the making of a garden the Californian has practically the world to draw upon. Indeed, so inclusive is the hospitality of the State's climate that the supreme temptation is to plant something of everything on earth and turn one's place into a botanic museum."

The writer goes on to complain of the preponderance of such medleyed horticulture in the State, which is another argument for the skilled and artistic worker in the beautifying of California home sites.

TREES A GREAT ASSET

Trees are another wonderful asset to the landscape gardener and the low-spreading oak has as wonderful possibilities as have the majestic redwood, or the singing pines. The man with an eye for harmonious effects will select a site suitable for the style of dwelling he intends to erect, or vice versa.

There are counties in the State where the redwoods run down almost to the ocean's shore; in other districts the madrone vies with the scrub or live oak, or tall poplars in martial rows look down with austere mien upon less formal locusts. The knowing homeseeker or home builder knows just how to utilize the trees upon the land chosen.

Water is always a favorite means of enhancing a garden landscape and California offers so wide a variety of marine and aquatic features from which to select that one need never be at a loss. Much of the country abounds in springs from which small brooks and often large streams flow toward some river. Lakes are common in many sections, and to the west is always the Pacific, visible from 1200 miles of coast land.

HILLSIDE HOMES

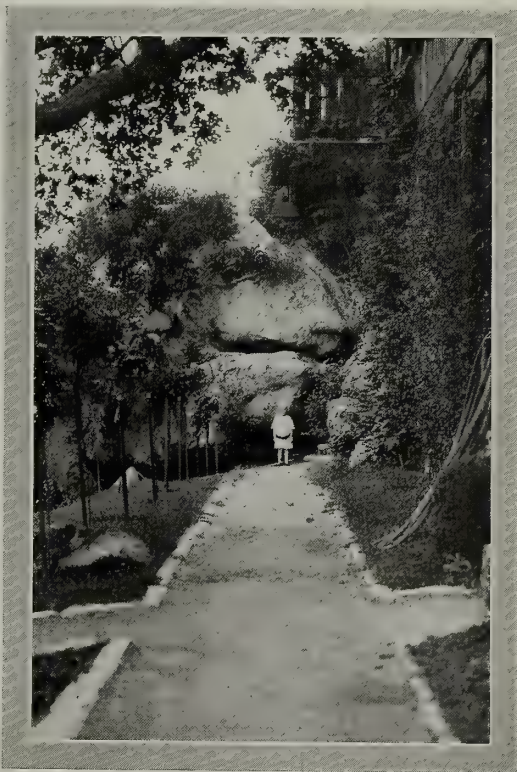
The hillside home is conducive to mental uplift and the homeseeker who has had his appetite whetted by Swiss chalets or Italian villas can find exactly what he requires in California.

The one who is fond of boating, fishing, hunting, out-of-door sports, has a great expanse from which to select a home site within easy reach of his favorite hobby.

Those who love to dwell in the shadow of historic associations, where ghosts of the past haunt the byways, may find in the vicinity of the old missions available locations for homes partaking of that type of architecture and gardening effect.

NATURE AND MAN

To sum up, it is the subdivision plan, with necessary restrictions, and the employment of persons of discernment to make the needful changes in landscape, and to plan the architecture that will eventually dot California from end to end with picturesque estates, each a type of beauty with distinguishing characteristics, until the State in its entirety as a place of homes becomes as much a paragon as in other respects. When Nature's hand and man's are linked in friendly clasp, and harmony reconciles their association, artificiality ceases to be artificiality and a perfection is wrought wherein beauty and utility are mingled in right proportions.



The straight line in rustic surroundings is necessary to accentuate the irregular charm of Nature's less formal moods



A house at Hollywood, Cal., where the dwelling has been made to fit the hill.—Arthur R. Kelly, architect



A cottage at San Diego, California. An adaptation of the flat-roofed Egyptian type
—Irving J. Gill, architect

Homes of California

By Arthur R. Kelly

President Los Angeles Architectural Club

Editor's Note: California is pre-eminently a place of homes. It possesses the natural advantages of scenic investiture second to none in the world, climatic perfection, etc., enabling the most fastidious to build according to their desires. Mr. Kelly, who has designed many of the most beautiful homes in the State, gives in his article a general survey of the home-making possibilities of California and also offers suggestions as to the character of structures that have found most general favor here.

IN CALIFORNIA a home is not a home without a garden of some sort; therefore when I speak of a home I mean not only the actual building, which is used as a habitation, but also the ground surrounding it, and even the vistas beyond its immediate locality. In fact, I wish to include in this term all of the

surroundings which lend to it anything of joy and beauty.

People have come to think, especially the people of the East, that the domestic architecture of California is distinctive and generally better than that of any other part of the country. The reason for so thinking is



A house at Hollywood, California, having the true feeling of the Spanish Colonial architecture at its best.—Myron Hunt and Elmer Grey, architects

undoubtedly founded on fact, for although California has not the great number of palatial residences that abound in the far East, the general average of architecture, especially among the moderate-priced residences, is very much above the average residence architecture of the East.

The reason for this is very easily explained. The houses of California, as a general rule, are all fairly modern and any one will admit that for this reason, if for no other, the average should be better. Because of this and because the architects of today are doing so much better work than those of yesterday and because the taste of the people of the whole country is better than it used to be, it is inevitable that the domestic architecture of the new far West should be better than that of the East, where for years after the decline of the old Colonial period, there was no domestic architecture worthy of the name. Cali-

fornia has drawn people of refined taste from all parts of the country and it is their strong appreciation of good architecture as well as their general high standard of what they require in their own homes that has made for the improvement of the quality of California domestic architecture. We can not say that the people of California have better taste than the people of the East, for the people of California are the people of the East, but because the homes of California are being built today by people who have more appreciation of good architecture than had the people of fifty or seventy-five years ago, and because the architects of today are a better trained class of men. The modern homes are not only better to live in, but are also better in appearance.

TYPES PECULIAR TO STATE

There are certain types of domestic architecture which are peculiar to California. Chief among these is what is known as the Spanish

Mission style of architecture. This style has, of course, derived its name and character from the old Spanish missions which were built in California by the Franciscan fathers during the Spanish occupancy of this country. These old missions have furnished the inspiration for the development of a style of architecture which at its best is undoubtedly very pleasing and especially fitting to this particular environment.

The California Spanish missions were naturally more or less influenced in design, by the style of architecture used in the churches and cathedrals of Spain and Old Mexico, from which their builders derived their ideas, and, truly speaking, a great deal of the so-called Mission architecture is more nearly Spanish or Spanish Colonial than it is Mission. There is, however, as shown in the accompanying illustrations, a true type of Mission architecture which carries out the coarse detail and generally crude, yet graceful outlines of the

old California missions. It is in this true Mission type that we have the one distinct contribution to architectural style, which is always associated with California.

Another type of residence architecture, which has not as yet, and probably never will reach such a stage of development that it will be termed a style, is a type of building which had its origin in and around Los Angeles. Messrs. Green and Green are the originators of the type, and they have taken for their traditional basis the architecture of Japan and Switzerland. The chief characteristics of this type of residence is the expression of an honest and logical construction throughout, with unusually wide projections of eaves and overhang and the almost exclusive use of the simplest of materials. This type of building has had a very wide popularity in Southern California, chiefly because it has been comparatively easy for the ordinary builder to grasp the fundamental ideas portrayed in the



This house at Nordhoff, California, is an example of how the Swiss type may be used in certain localities effectively.—Myron Hunt and Elmer Grey, architects



A Swiss chalet at Hollywood showing the type in a characteristic setting

—Arthur R. Kelly, architect

work of its originators, and not only a number of architects, but hundreds of builders as well, are following with no small degree of success, the lead of these very clever designers.

THE POPULAR BUNGALOW

Another type of building, which can hardly claim the dignity of being called a style, but which nevertheless is now seen in all parts of the United States is the bungalow. The word "bungalow" was originally applied to the low thatched roofed houses of India and the first buildings in California, to which this name was applied, were in a general way adaptations of this Indian dwelling to the requirements of American family life. Now, however, the term "bungalow" is applied to almost any type of small dwelling of either one or two stories, and strange to say, those buildings which most closely follow the lines of

the buildings from which the name was derived, are very much in the minority. To California, nevertheless, belongs the honor of having built the first American bungalows, and if the popularity of the type is any criterion, it is a very great honor indeed.

Another development of the bungalow idea which is distinctive to California is the bungalow court. As yet, this idea has not been used much in other parts of the country, but it undoubtedly will spread as the bungalow has spread over the whole United States. As a source of income, the bungalow court is one of the best of any of the schemes which have to do with rentals, and its success lies in the fact that so little ground is necessary for the building of a satisfactory court. For the benefit of those who are not familiar with the idea I will explain, as well as illustrate, the

essentials of the scheme. Bungalow courts are usually built on lots having a frontage of not less than sixty to one hundred feet, and with a depth varying from one hundred to three hundred feet. The usual plan is to run a drive or walk down the center of the lot and to locate the houses at intervals along the sides of the lot facing toward the center. By this arrangement a large number of exceedingly attractive and rentable houses can be built on a comparatively small piece of ground, and the rent derived from such a scheme is usually all that the most avaricious landlord could wish. These small houses are very often sold to individuals so that each plan is distinctly a home, although the ground space that goes with the house is sometimes very little indeed. Some very attractive gardening has been done in connection with these courts as is evidenced by some of the accompanying illustrations.

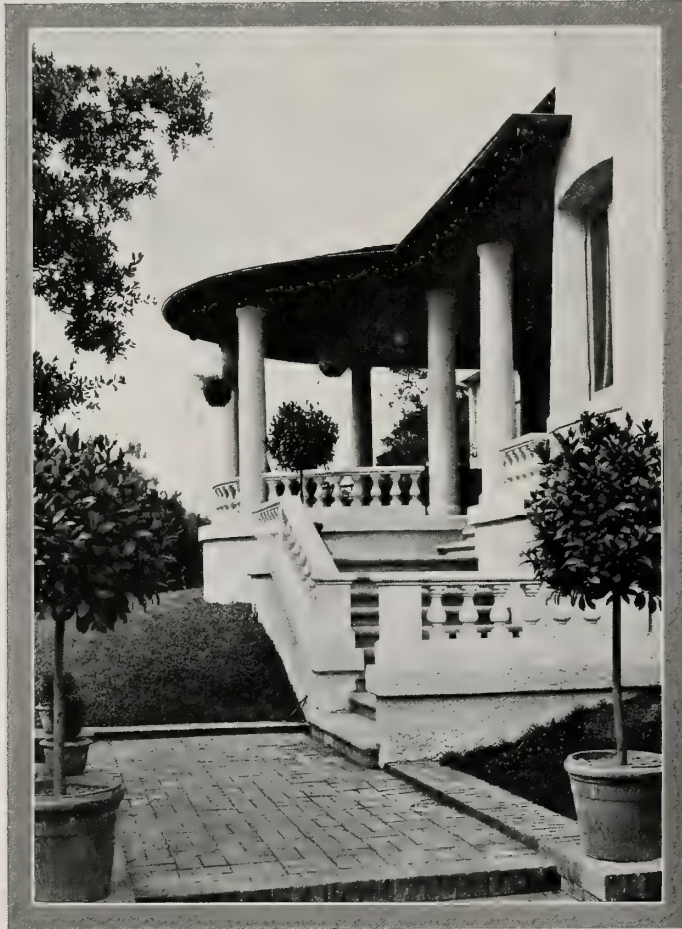
TRANSPLANTED STYLES

Beside the styles and types of homes which

are distinctive to, or have been originated in, California, there are hundreds of other styles and types of houses which are transplanted from other environments. Among these are some which have originated in the United States, but which are peculiar to certain localities. The Colonial and Dutch Colonial styles have been used in California with no little degree of success, from the standpoint of good architecture, but still there is a sort of inconsistency in building a house of this type, which was originally designed for the cold, snowy East, in a land where sunshine and bright skies are the rule rather than the exception, and where snow is never known except on the tops of high mountains. Whatever esthetic reason there may be for not building any particular style of house in any particular locality, the fact still remains that man has a right to build his home where he chooses and in whatever way he chooses, and as long as this right exists, houses of all sorts will be built



An attractively picturesque interior.—Myron Hunt and Elmer Grey, architects



Interesting detail of home at Oak Knoll, Pasadena, possessing a suggestion of Spanish architecture.—*Elmer Grey, architect*



Cudahy ranch house near Los Angeles; attractive because of its long horizontal lines and rustic clearness.—*Arthur R. Kelly, architect*

in all sorts of places in all sorts of styles.

As in every other part of the United States, the domestic architecture of England has had a strong influence on California homes. There are a great many half-timbered Elizabethan houses in California; some have followed precedent to a large degree, while others have only kept the general feeling of the work from which their inspiration was derived. Needless to say, there are a great many architecturally bad half-timbered houses in California, but there are a good many which are very creditable interpretations of the style.

Of the countries whose climatic conditions and topography somewhat resemble those of California—Egypt, Italy, and Spain—have lent to our residence architecture a most pleasing influence. There is nothing more fitting to California environment from an architectural standpoint than the white walled, tile roofed houses of Spain and Italy, or the flat roofed houses of Egypt.

Few of the architects who have used the Egyptian houses as the basis for their designs have gone so far as to leave off all cornice molds. The flat roofs with various cornice projections, from a narrow mold to a three or four-foot cornice, are seen in large numbers in all sections of California; but in the south, around San Diego, a few architects have left off any suggestion of a cornice. This type is rather pleasing in effect when it is well handled as to proportion and spacing of openings,

but it takes a man with a strong appreciation of proportion to handle successfully so difficult a problem as is presented in the treatment of wall surfaces devoid of detail, and with only the size and placing of openings to work with.

BRILLIANCY OF WHITE PLASTER

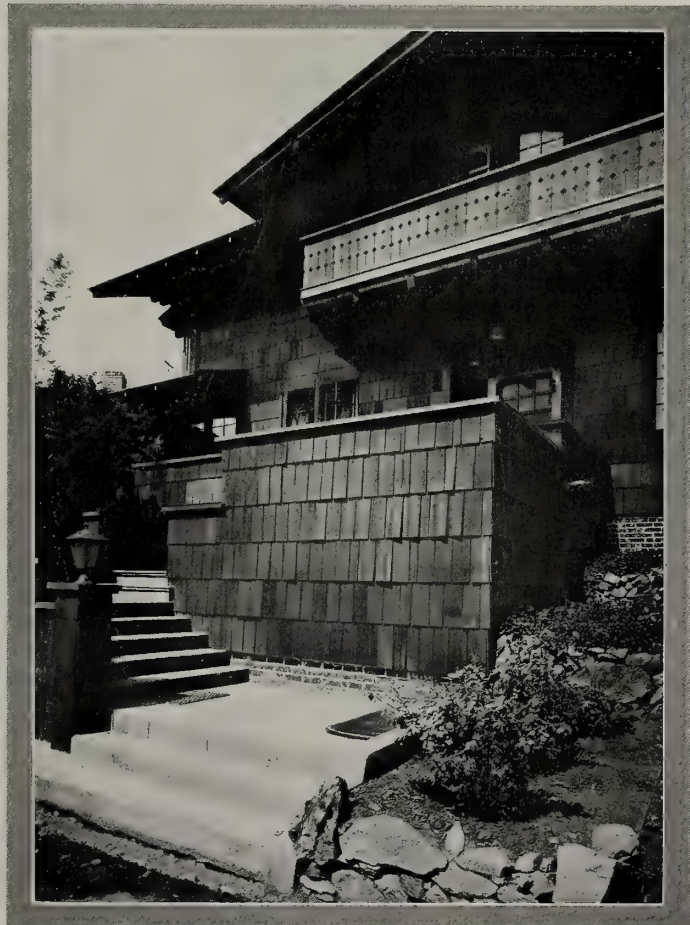
Because of the clear atmosphere of California, and the consequent sharp and brilliant shadows which occur, white plaster seems to have a brilliancy which no other exterior wall covering can obtain. It is undoubtedly this brilliancy of shadow which is responsible for the general pleasing effect of most white plaster houses. Architects of very moderate ability and designers and contractors who have no architectural training whatever have often built white plaster houses which would pass muster under all but critical examinations.

A great many of the houses of California which have been carried out along the lines of the Italian villas have been especially successful because the climatic conditions of Italy are so nearly the same as those of California. Then, too, the topography of the two countries is quite similar, and those houses which have been designed to follow closely the simple type of Italian villa, have been especially successful in this setting. This is not so generally true of the more pretentious houses in the Italian style, principally because the ground space around them has not been sufficient.

In those adaptations of the Italian style of domestic archi-



A detail of the Cudahy ranch house



Detail of a Swiss chalet at Hollywood.—Arthur R. Kelly, architect



Patio in Oak Knoll, Pasadena, typifying the out of door living room

—Myron Hunt and Elmer Grey, architects

ture in which simple wall surfaces and beautiful proportions have been the dominating note, and where the detail has been treated with refinement and not exaggerated, we have examples of some of the best homes of California. The red tiled roofs, the white plastered walls, the beautifully molded cornices and the clean-cut treatment of all the details which are the characteristic features of this style of architecture seem to fit in especially well with the bright sunshine and brilliant blue sky of this beautiful country. With the sharp contrast of light and shade that is so emphasized in this type of house, the whole composition seems literally to sparkle and snap with brilliancy, and we do not wonder that not only architects, but even "jerry builders" are attempting to solve their problems in home building by the use of this most interesting and popular style of architecture.

Similar in general characteristics, but differing materially in detail from the Italian style,

the Spanish and Spanish Colonial architecture has exerted some very beneficial influence upon the domestic architecture of California. That it has not had more influence is due to the fact that only the architects of wide experience and training are at all conversant with the style, and because of this fact, it has been the more monumental buildings rather than the residences which have felt its influence. However, the architects who have created homes in this particular style have usually been men of thorough training and some remarkably good work has been turned out, as is shown by some of the illustrations accompanying this article.

Those of the less pretentious houses of California which can boast of being designed along any particular line have had, in a great many cases, the Swiss chalet as a basis for their style. Naturally, large numbers of these are badly done, because of the lack of training of their designers, and because in numerous cases, loca-

tion has not been taken into consideration. A Swiss chalet can not be successfully built on a small flat city lot crowded in between other houses of conflicting types; and if the owners or designers of houses for such locations had any esthetic feeling whatever, they would not attempt such an utter impossibility. Nevertheless, where the location has been suitable, and the architect has been competent, the Swiss chalet has been used with very great success.

CLIMATIC CONDITIONS

Climatic condition has had a much more general influence on the plan of California houses than it has on their exterior design. Naturally, the homes of this locality are planned to take advantage as much as possible, of the out of door life which is so enjoyable in this delightful climate, and rarely is a house planned which does not, to some extent, contemplate some pretense at a garden. Most

every house can boast a garden porch which in a way ties house and garden together. The abundance of large French windows and spacious doorways, making it possible to open up the whole house to the out of doors, bespeaks the influence of climate on our systems of living. For nine months in the year more than half of our day life is spent out of doors, and when it is necessary that time be spent inside the house, those homes which are most successful are those in which the plan is so laid out so that house and garden are as one, and a constant reminder is always present of what lies just beyond the doors. This tying together of house and garden is coming to be a more and more important feature of California houses, and in those houses which have been planned to take advantage of all that nature and the climate have to offer, we have the most successful type of California home.



Patio in a house at Covina, California, showing the use of the Spanish interior court
—Arthur R. Kelly, architect



Italian Pergola effect to garden porch of Covina home.—Arthur R. Kelly, architect

California's Gardens

By Hugh Bryan

ONE could not write of California without dwelling at length upon her gardens. Neither can one write of the gardens of California without considering the wonderful climatic conditions that make these gardens possible and the magnificent variety of natural scenic effects that are a setting for her gardens, and for which she offers ten thousand grassy mountain slopes, woodland hills and forest plains, the blue Pacific and snow-crowned mountains, with the warm sunshine over all. In fact, California without a garden would be as beautiful as she is with gardens, but in a wild and willful way we could not love her without her gardens as we

do now, for the gardens make their own peculiar impressions upon the heart; they give to one moments of ineffable enjoyment, a pleasure so pure that it removes us from the cares of this earth and fills us with peace.

In no other part of the United States have the people taken to the witchery of gardening as they have in California, and I am pleased to note that this evidence of taste and refinement is not confined to those of the wealthier class.

The majority of the unostentatious homes of the middle class are things of beauty on account of the taste displayed in the treatment of the grounds. Each property of this



A vista lending joy and beauty to the home.—*Myron Hunt and Elmer Grey, architects*

class carries an impression as to the personality of the owner. I have in mind two small gardens that are now in bloom, one made of azaleas, ferns, and lilies, the other of roses and pansies, both perfect and both completely satisfying to a lover of the beautiful. No better results could have been obtained upon a hundred acres with unlimited means than have been obtained upon these two small lots at an insignificant outlay of money, for they are perfect. I have no doubt but that when the season of bloom is over for the plants now showing others will take their place which will reflect the refined taste of the owners quite as well as those now in bloom.

Those who visit us from the North and East are apt to form the impression that California is a State of beautiful flowers and gardens partially for the reason that plants that bear flowers grow here without any special care. Nothing could be farther from the fact. True, the soil and climatic conditions

of California are such that plant life attains a high degree of perfection here, but gardens here require as much and more constant cultivation, more water and more intelligent care than they do in a country where for part of the year plant life is at rest. If the garden owner of California would have his garden pretty the year through he must use great care in the selection of his plants for a succession of bloom in summer, winter, spring, and fall for there is no season of the year, at least in Southern California, when the garden may be bare, whereas the Northern or Eastern gardener has only to consider the three seasons of spring, summer, and fall.

While California has no old gardens as the gardens of England are old she has some of the most notable gardens in America, among which are the gardens of Mr. Busch and Mr. Huntington of Pasadena, several descriptions of which have been written by more able pens than mine. There are many other

beautiful estates, perfect in every detail of waterways, pools, fountains, statuary and garden buildings, but these gardens are the work of professional landscape gardeners and no more represent the home life, tastes, and pleasures of the people of California at large than the paintings of Corot represent the artistic development of the people at large of his time and of his country, whereas the cottage and bungalow gardens of the middle class of Californians do voice the state-wide love of the beautiful.

The architects of the State have done more to make the really beautiful gardens of California possible than any other influence; they seem to realize to a high degree the fact that whatever is done in the way of gardening is helped and encouraged by the presence of harmonious architectural lines in the buildings and that no amount of skill in gardening can

soften the presence of an ugly building. The better class of landscape gardeners realize this to the extent that they insist upon all architectural lines in pergolas, walls, and garden buildings being dealt with by the architect of the building.

On the other hand some really good possibilities have been spoiled by the architecture predominating in what should be the living part of the garden, and waste and harshness the results of elaborate tracery on the ground. I know of one garden designed by a leading architect of Southern California, the lines and proportions of which are perfect, but his selection of plants was so unfortunate that even now the place begins to look overloaded and in a short time the planting will have to be done all over by one better versed in the science or art of gardening. The best results in the large and small gardens of California



Example of the out of door living room in the rose-covered porch and flower-filled garden
—Myron Hunt and Elmer Grey, architects

have been attained when the architect and landscape gardener have worked together toward the same end.

The amateur gardeners of California have done a great deal to build up the reputation of the State in the matter of gardening. In an article of this kind one does not feel free to mention private places, but in connection

with the subject of amateur gardening I can not refrain from using the property of Mr. Arthur Letts of Los Angeles as an example of what the amateur gardener can accomplish, for in planning his gardens Mr. Letts has made no mistakes that are not quite excusable and he has avoided any effect that looks ugly or extravagant.

WHEN the day's work is done, when the cares of business have been put aside and the desire comes to rest and reflect, to renew one's mental powers for the morrow—what place so desirable as home? And how essential that home should be homelike—delightful in its appointments, pleasant in its surroundings, though not necessarily expensive. California is a State wherein homes may be made under the most auspicious conditions, where a man may suit his pocketbook and yet find much that is to his liking. There are advantages and opportunities for picturesque homes, simple or ornate, as the case may be. The environment provides beautiful locations, affords suggestions for individualistic, characteristic, architectural styles and for the arrangement of gardens that delight the eye and, in many instances, contribute to the income. There are many men and women in California who on small places are making comfortable livings by raising flowers for market. Think of that—you who toil in some two-by-four office or noisome factory—think of making a living by tending flowers in a land that is a veritable flower garden throughout its length and breadth. Rich or poor, old or young, California is and should be the goal of those who seek a spot wherein to pitch their tents and build their camp fires; it is pre-eminently a homeland, where the songs of the birds lull one to sleep at night and soft airs burdened with tropic fragrance play an obligato. It is a land of joyful work, where energy comes with the sunshine and the odor of the pine woods; it is a place in which to labor and laugh and love and live. It is the homeland of the world.



WELL has this been named Sentinel Rock, for it stands guard over the enchanted valley of Yosemite—an eternal trust that it will never forsake.



On the Coast Route south of Mission San Jose

The Automobile in California *Life and Industry*

By S. L. Mitchell

Secretary Automobile Club of Southern California

Editor's Note: The automobile has exerted irresistible force for the improvement of California roads and highways, and how fully such improvement is justified by the place which automobiles, motor trucks, tractors, etc., occupy in California activities, both recreational and productive, is impressively presented by Mr. Mitchell. He gains mastery of his subject by experience, by wide acquaintance among others who lead in use and promotion of the interests of the elegant and powerful posterity of the old "chug wagon," and his article will interest everybody.

IF THERE is any historical date of greater importance to California than those of 1849 and 1915, it is found in the year 1896. Looking backward through the smoked glass of time, the eye is pretty certain to light upon the year 1896 as the beginning of things so far as the "motor vehicle era" is concerned.

It is true that the Charlie Rosses of the motor world are continuously turning up and crying: "Here I am. I am the first auto-

mobile ever built. You must recognize *me*." But for the most part a very little time given to investigation generally disproves the assertion and the investigator reverts to 1896 as the year in which the automobile came into its own.

All of which is by way of showing that the future of the motor car in California—and its present, too—had its beginnings only a comparatively short while ago.



Grizzly Giant on Pine Crest Road

After all, it is a remarkable thing that California has come to assume the leadership in the advance of motor-car history, and yet it has. Separated from the birthplace of the first "benzine buggy," as the inventor christened it, by chains of mountains, by rivers and by generations of transplanted civilization, California reached across those mountains and plucked the motor car to her bosom. I think the reason for the rapid growth of the use of automobiles on the Pacific Coast is found in the eagerness of the Californian to adopt new ideas. The motor-driven vehicle was a new idea, and where the conservative East waited, the impetuous West seized at it and made it its own.

INFLUENCE OF THE AUTOMOBILE

It was only natural then, that the auto-

mobile should bring with it certain direct influences upon the people of the West, upon the industries and even upon the very contour of the country itself. In the order of the regeneration, the building of highways must come first. It was early seen that an automobile without roads was as useless as a pen without ink. Perforce, the roads must be built. I think the awakening was simultaneous over the entire State of California, but in Southern California the road building activities have soared to their greatest heights.

At first roads were built mainly for pleasure purposes. The economic significance of highways was the introduction of another factor into the scheme of things—and that was the birth of the "motor truck." Early owners of



One of California's choice country boulevards—
near Atascadero



An ideal stretch of road three miles south of Paso Robles

automobiles were wealthy—they had to be. And automobiles were luxuries. So the fight for better roads in California was at first a bitter one. Then, like an avalanche, the demand for more and better highways swept over California until today this State, so far as rural roadways are concerned, leads America.

AS AID TO THE FARMER

Instead of superseding the railways, the motor truck has allied itself with them. Out of the way centers have been linked to market centers first by the motor truck and then by the railway, the latter often completing the transportation of farm products to the urban consumption bureaus. The farmer has long since withdrawn his protest against the "devil wagons" and has gone on record as among the foremost of the road constructionists.

Millions of dollars have been expended by State and by counties for smooth, durable and *endurable* highways. Millions are about to be spent. In a single year, motorists of California paid into the State treasury more than \$1,250,000 in license tax moneys. This sum was divided equally between the counties in

which it was collected and the State itself—to revert to the construction and maintenance of more roads. This sum will be increased during the years to come and as the roads are fashioned with it, new territory will be thrown open to homesteaders and agriculturists who are more and more finding their way about by automobile and subsequently shipping their produce to market by motor truck.

Like an endless chain the growth of popularity of the automobile is coupled with the growth and development of the country, the highways, industry, farming and commerce. It matters very little if more automobiles mean more roads or if more roads mean more automobiles; the one follows the other as the day does the night, and with the cycle there comes the stimulation of commercial activity..



White oak, draped with moss, near Gaviota Pass—a little off the beaten track

California, leading the United States as it does in the number of automobiles, per capita, in actual operation, is at this time occupying almost the entire vision of many of the most important motor vehicle manufacturers. Branches are being opened throughout the State every day, thousands of men are given employment and almost hundreds of factories for the making of accessories are built during the year. These are some, and only some, of the economic significances of California's automobile era.

INCREASED EFFICIENCY

No longer must the professional man waste hours of his day in transit from one calling point to another—his working time is doubled because of the time-saving motor-propelled vehicle. The efficiency of the physician is increased, as is the economic value to the community of the lawyer and the practitioner of any branch whatsoever in the scheme of social service. It is not a hypothetical statement, this. However, there is another and less concrete phase of the development of motor car activity which must at the same time be reckoned with and perhaps more emphatically in California than in any other state. That is the reactionary significance of the automobile. At first this was a factor only "among the classes," but that was true when gasoline cost almost as much as milk and when six-cylinder cars were

considered impossible. To glance along any of the Southern California boulevards this year is to be reassured immediately that the "masses" are "getting theirs," thanks to the reduced cost of motor cars and the reduced cost of keeping them on the roads.

To the nation this getting out of doors by the masses has a very real significance, for each year it means the preservation of humanity, the quickening of sluggish intellects and a wide-awake interest in the land which produces the bread of America.

Certain unfortunate circumstances abroad presage another factor in California history. A general sentiment is spread over the country that to "go West" is the domestic equivalent of "crossing over." In other words, that California is to America what France as a touring ground is to the continent. So California is very probably about to enter the lists as the magnet which will bring out of Eastern garages the cars which always before have gone to Europe for their winter, fall and summer touring. It will rest, in a large part, with California whether or not the succeeding years will find these same cars aptly employing the new slogan—to "see America first." If so, many millions of American made dollars will be spent in the place of their birth which heretofore have found their way into the coffers of certain well-known continental inn-keepers.

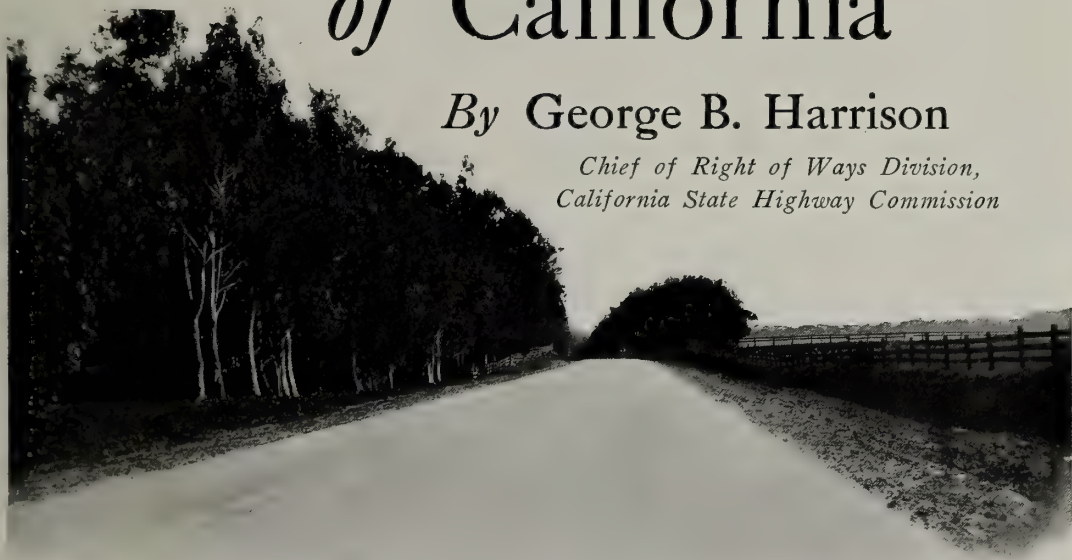


Palm-Shaded Drive in Southern California

Roads and Highways of California

By George B. Harrison

*Chief of Right of Ways Division,
California State Highway Commission*



Where the Road flows away like a white river

Editor's Note: California is now spending \$40,000,000 of State money in the construction of a rational system of concrete State highways which will carry travel and traffic through the great valleys from end to end of the State and across these valleys and their inclosing mountains from side to side of the State on several points. What the State is doing is being multiplied by county appropriations. Mr. Harrison adduces great facts and comments to give the reader some idea of the activity in this fundamental phase of State development.

CALIFORNIA is in the midst of a period of reconstruction,—that is evident in all lines of activity,—and a fundamental phase of it is the work of rebuilding and modernizing her principal highways. A State with 130,000 motor vehicles; with a thousand and one remarkable sights for tourists scattered over 1000 miles on the level stretches and 3000 miles along the ocean and over the mountains; with a climate that makes life indoors almost immodest at any time of the year; with the

Yosemite, the Lassen volcano, the Big Trees, the Mission sites and traditions, the Seventeen-mile Drive, and one hundred and one Ramona's marriage places; and with room and resource for a nation's population—such a state would not be meeting her twentieth century responsibilities without a modern and adequate system of highways. And hence, among all the activities recorded by "The California Almanac," not the least of the advancement is that of building 3000 miles of State



Here the roadway leads between spreading orchards, redolent of perfume from myriad blossoms, in Santa Clara County

highways of the best type, a basic system for future supplementing by state and county planning.

The State highways comprehend the modern roadways now being built under the mandates of the State highways act approved by the people of California in November, 1910, and providing a bond issue of \$18,000,000 for acquiring and improving in a permanent manner, a system of highways by the State. In the wording of the act this system was to be "so laid out and constructed or acquired as to constitute a continuous and connected State highways system running north and south through the State, traversing the Sacramento and San Joaquin valleys and along the Pacific Coast by the most direct and practicable routes, connecting the county seats of the several counties through which it passes and joining the centers of population, together with such branch roads as may be necessary to connect therewith the several county seats lying east and west of such State highway." The law also directed that construction must be permanent in character with permanent control and maintenance by the State.

DIFFICULTY OF EARLY TOURING

The intention of the law was to secure reconstruction of the State's inadequate highways. There were many old-timers' roads which ran hither and yonder with an easy disregard of distances, straddling the section lines with right-angled turns in the valleys and climbing the mountains as abruptly as nature dictated. Pioneer motorists were trying to "see California" over roads that dragged deep in sand, covered them with dust or mud, tested their cars and their tempers, and often presented slopes which invited the automobile down the mountains while negotiating a grade of 25 or 30 per cent. A few counties, notably Los Angeles, San Diego, San Joaquin, and Sacramento, had improved roads within their respective boundaries, but in many sections—even out of San Francisco—the roads were abominable. The state highways act endeavored to respond to the twentieth century traffic call with a thoroughly modern and adequate highway system.

Administration of the act is now in the hands of the California highway commission, consisting of Mr. Charles D. Blaney, Mr.

Newell D. Darlington, and Mr. Charles F. Stern, with Mr. Austin B. Fletcher, highway engineer, as executive officer of the commission. The commissioners were appointed by Governor Hiram W. Johnson, who found the State highways act among the large responsibilities grouped for the beginning of his first term of office.

The mandates of the law and the obligations to the bondholders together with the pioneer nature of the work and the difficult engineering conditions presented in California, offered a problem of dimensions to the highway commissioners when they assumed office in August, 1911. At that time Mr. Burton A. Towne, who was later impelled by pressure of his own business to resign, was made a member of the highway commission with Mr. Blaney and Mr. Darlington. The commissioners found no one who had the explicit idea of the manner of laying out the proposed system of State highways. Governor Johnson himself has said that when the State highways act was considered prior to the selection of a commission there was no one in his official circle to suggest a definite plan for meeting the instructions of the statute. A general agreement seemed to be reached, however, that the con-

struction of three thousand miles of permanent and adequate types of modern highways within an expenditure of eighteen million dollars was an exceedingly difficult project, if at all feasible. Experts placed the probable cost of such a system, according to their respective interpretations, at sums varying from thirty-five million to fifty-four million dollars.

A PROBLEM SOLVED

The highway commission was confronted, therefore, with this problem: Take eighteen million dollars, divide by three thousand miles of road costing probably ten or fifteen thousand dollars per mile, and turn any surplus back into the State treasury. The commissioners attacked the problem, and the more they saw of California the more they guessed they had not been given a simple task, but they reached a solution. A definite plan was developed; the best road builder in America, from all testimony, was made the commission's executive officer; a businesslike and efficiently checked organization was perfected, and the State was districted and placed in charge of capable engineers subordinate to the highway engineer; practically seven thousand miles of possible trunk roads were personally inspected;



A woodland road in the heart of the Redwood Forests



On one side a sloping hill, on the other a deep ravine
—Safety first is a feature of the State Highway

an approximation, roughly, of the probable cost was made by counties.

A system of principal or trunk routes was developed in accordance with the provisions of the law. Four such routes were established, making two main north and south roadways. One followed the coast, in general, starting in Del Norte County, passing through Eureka, Ukiah, Santa Rosa, San Rafael and other cities and towns en route, and meeting the San Francisco ferry connection at Sausalito. A continuing route began at the limits of San Francisco, and passed through San Mateo, Redwood City, San Jose, Salinas, San Luis Obispo, Santa Barbara, Ventura, Los Angeles and Santa Ana to a termination at San Diego. Two other routes were comprised in the valley or inland portion of the main State highway. One began at the Oregon boundary, where it is now joined to the Oregon section of the Pacific highway, and linked Yreka, Redding, Red Bluff, Yuba City and Marysville with Sacramento. The fourth route was planned through the San Joaquin Valley from Sacramento via Stockton, Modesto, Merced, Madera, Fresno and Bakersfield to Los Angeles.



Completed State Highway in Southern California

Surveys were directed on these routes, and they are now within 95 per cent of completion. The principal secondary lines also have been surveyed, and several are under construction. One connects the San Joaquin Valley with the beach at Santa Cruz via Oakland and San Jose. A route is under way between Sacramento and Davis which includes sixteen thousand feet of trestle, and which will shorten materially the distance between Sacramento and the San Francisco Bay cities. The county seats on the western side of the Sacramento Valley are being connected by a paved highway through Corning, Orland, Willows, Williams (from which a short spur leads to Colusa), Woodland, Fairfield and Benicia. Across the strait from Benicia the State highway follows above the Contra Costa shore until



Concrete Bridges such as this are often seen on the State Highway

Berkeley and Oakland are reached. A "cutoff" will be available by way of Napa to the Sausalito ferry. In the San Joaquin Valley, Visalia and Hanford are to be linked by an east-and-west lateral connection with the main trunk, making a route which probably will be extended westward to the coast road. In Southern California there are important laterals to Pasadena, San Bernardino and Riverside, and a highway over the mountains between El Centro and San Diego for the "Imperial country."

The foregoing enumeration of routes is a list of those which 1915 will see completed or well under way. There are other laterals of vast importance to California which the highway commission is striving to include for early completion. Although they are included



A bit of State Highway along California's Twelve Hundred Miles of Seacoast

in the secondary problem of State highway construction their importance to the State is tremendous, both in relation to touring attractions and in adding population and values by developing agriculture, horticulture, stock raising and mining. These laterals reach, in the main, to the mountain and trans-Sierra counties, where there are great scenic attractions and wonderful opportunities, but a woeful lack of good roads. The population is relatively small, and the necessary road expense is large; the advantages to the State justify fully assumption of this work as a State undertaking. With good roads will come settlement and a large addition to the re-

sources of California. There will also be added a large number of tours, now barred to all but the hardest motorists, but which when modernized will be advertised far and wide as features of California.

GOOD ROAD STANDARDS

Highways improved by the California highway commission meet the following general standards, as stated by the highway engineer: "A right of way not less than sixty feet in width, where it is reasonably possible, and as direct between objective points as is consistently possible; gradients not exceeding 7 per cent, even in the mountainous parts of the State; curves as open as possible and in



Protection for the autoist on the gracefully curving State Highway adds comfort and joy to the great marine drive along California's ocean shore



All the beauties of nature without the discomfort of dusty or muddy roads on the State Highway down the Peninsula from San Francisco

no case less than fifty feet in radius; as many culverts of sufficient capacity as are needed to take care of surface and underground water; a traveled way under ordinary conditions not less than twenty-one feet in width, and in mountains not less than sixteen feet wide, with the center paved or surfaced so as to be hard and smooth under all climatic conditions at all times of the year, the width of surfacing to be in general fifteen feet; smoothly graded roadsides, reserved for future tree planting." The policy of paving the trunk roads was early adopted, but no rigid standard of applying the same type of pavement to all localities was

considered; the type of paving laid in any locality depends upon the traffic requirements peculiar to that locality. Where the traffic volume is great the paving is wider and the wearing surface thicker than where a moderate traffic is found.

Over the greater part of the paved mileage, however, a type is being constructed well adapted for conditions in California, and which for practical purposes is virtually a city street along the outlying highways. A permanently hard and firm subgrade with a cement concrete base and a bituminous wearing surface of one-half to three-eighths inch provides a highway pavement which has been tested severely in the California State work, and with a success fully justifying its adoption. Such a pavement is used when there are ideal subgrade conditions and an absence of frost. Under more adverse conditions the base is thickened. When the traffic demands, a thick wearing surface of asphaltic concrete is used. The four-inch concrete base with the thin bituminous top has been open to constant and exacting traffic on a portion of the State highway for more than two years without



In the hollow of the hills, yet a level road. No grades on the main routes of the State Highway exceed 7 per cent

showing appreciable wear, and it appears to be good for two years more without repair. Materials are of California origin throughout. Lateral roads are paved only where their traffic makes them practically main roads; in general, they are surfaced with gravels or other good local material.

COUNTIES ASSIST

The highway commission has been able to extend the mileage of highway improvement and to increase the amount of pavement considerably by economies and savings put into effect at the beginning of the work. The counties have agreed, almost without exception, to contribute rights of way and bridges for the State highways. Construction is omitted within the limits of incorporated cities and towns. Cement and other materials are purchased in large quantities by the State at extremely low prices, and the Southern Pacific and other railroads have granted very low rates on State highway materials and construction machinery. The savings thus obtained aggregate several million dollars, and permitted an accordingly greater mileage.

Of the three thousand miles of modern highways planned for the California system location surveys had been made at the beginning



A perfect stretch of road in Southern California

of 1915 on 2150 miles, and of the mileage surveyed plans and estimates with layouts ready for construction had been completed on 1164 miles. Contracts had been let, including a certain amount of work undertaken with day labor, on 897 miles, of which 650 miles were for the construction of concrete base with the thin bituminous covering and 19 miles were concrete with a thick wearing surface. Forty miles were macadam, and the remainder was practically all graded road only, most of which must weather the rains of one or two winters before the pavement can be laid.

The headquarters of the California highway commission are at Sacramento, and division offices are also located at San Francisco, Los Angeles, Fresno, Willits, Dunsmuir and San



Like a shaded country lane is this beautiful San Mateo roadway

Luis Obispo, and at any of these offices inquirers interested in good roads are welcome. Reports of progress and other information relating to the State highways are published in the highway commission's "Highway Bulletin," which is sent free of charge to any interested person. Travelers seeking information about tours and touring conditions in California may obtain suggestions from the unusually efficient information departments of the automobile clubs at San Francisco, Los Angeles and Santa Barbara.

MOUNTAIN ROADS

The State has improved a number of roads in mountainous districts with funds independent of the bond issue provided for the State highway. These State roads are constructed and maintained by the State Department of Engineering, and are now under the supervision of State Engineer W. F. McClure. They cross the mountains toward and serve Lake Tahoe; extend through the Sonora pass to Bridgeport, and are individual roads in Lassen, Mono and Trinity counties.

State highway construction has been preceded by county improvement of roads in Los Angeles, Sacramento, San Diego and San Joaquin counties. Other counties, particularly in the southern part of the State, have undertaken local road improvement of a modern type. Orange, San Mateo, Riverside, Kern and San Bernardino counties are in line, and

Santa Barbara, Sonoma and Tulare counties have had improvement under consideration. Other counties have considered road building to a lesser extent. Los Angeles County, which had several hundred miles of paved highways, and plans to extend the mileage until every section of the county will have been served, finds that the reconstruction of her roadways is worth many times the expense. Orange County, smaller in extent, but with 107 miles of paved county roads just finished, testifies that the undertaking compensates for bond payments and interest and leaves the county richer after wiping out the debt incurred for good roads.

That the value of her highway improvement means more to California than a new trans-continental railroad is beyond dispute. The completion of the State highways means that all parts of the State will be accessible, easily and safely, for the motorist, that commercial traffic will be greatly advanced, that the tours into historic and scenic sections will be advertised in winter and in summer in all parts of the world where travelers are appealed to, that rich agricultural and horticultural sections will be opened to invite settlers, that Californians will form the habit of acquaintance with their great State, and that millions of dollars will be added to the wealth of California over and above the total cost of the road improvement.

“TO THE motorist with pioneering instinct who delights in exploring the unbeaten paths of the wilds, the great chain of the snow-capped Sierran cordilleras of our Western Coast offers untold possibilities. . . . Perhaps the most inspiring feature of the beauty of these mountains is to be found in the granite gorges and canyons that cleave the western slopes to depths of three and four thousand feet.”—*Charles J. Belden in "Scribners."*

Electric Transportation *in* California

By Paul Shoup

President Pacific Electric Railways Company

Editor's Note: Mr. Shoup, who had years of training in steam railroading, and afterward became our leading "lightning conductor" in transportation enterprise, writes a descriptive article on the development of suburban electric lines in California, in which California in some respects leads the world. He shows how California's largest cities are in a way the product of trolley systems. People in all parts of the world may read how fine our systems and equipments are, of the way they have been secured, and what they are doing for the joys of California life and the advancement of industry.

THE interurban electric railway systems of California are practically a product of the last fifteen years.

Their growth, until recently, has been rapid, and nearly every fertile section of the State has one or more systems in the embryo or reasonably comprehensive as to the territory it serves.

The greatest single development is that of the Pacific Electric Railway Company in and around Los Angeles. Its lines serve a territory 2500 square miles in area, with a population of 750,000 people. This system grew from the small beginnings of 1900 to 601 road miles and over 1000 track miles in 1915.

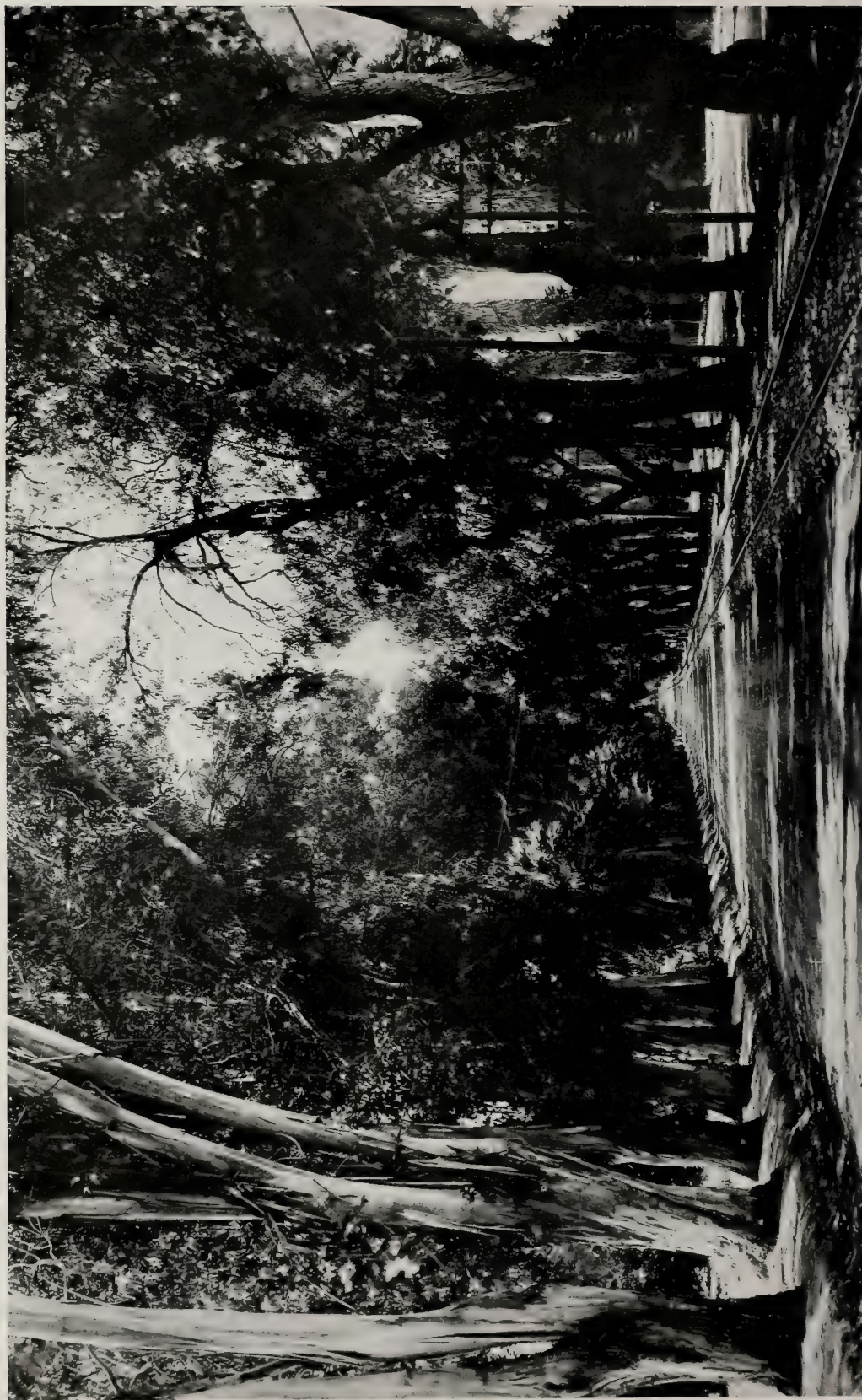
The first principal development was naturally in the immediate vicinity of Los Angeles, and it has made of that city the greatest interurban electric railway center of this country. The Pacific Electric connects Los Angeles with more than forty other incorporated cities and towns. The few towns in Los Angeles, San Bernardino, Riverside, and Orange counties not served by the Pacific Electric are relatively rare enough to

prove the rule that this system "reaches all points."

Its development in the last year or two has been chiefly in building links connecting detached sections of the system. The local lines serving respectively the Riverside and San Bernardino valleys were joined a little more than a year ago, and the eastern division thus formed was connected with the main system around Los Angeles in July last, giving a direct route between the Los Angeles section and San Bernardino, Redlands, Highlands, Colton, and Arrowhead Springs. In February of this year the line between Riverside and Corona was opened, and in March a direct route between Los Angeles and Riverside was established through Rialto and Bloomington.

The expanse of territory now served may be judged from the distances between the points at extreme ends of the system, as follows: San Fernando and Corona, 105 miles; Redlands and Owensmouth, 97 miles; Balboa and Highlands, 103.60 miles.

The company operates, as an adjunct to



Where the suburban railways run for miles parallel with splendid roadways, sheltered by tall trees. On line of Pacific Electric in Southern California



Alpine Tavern, Mt. Lowe, California

its interurban service, city systems in Pasadena, Long Beach, Santa Monica, Venice, Pomona, San Bernardino, Redlands, Riverside and Santa Ana, as well as a part of the Los Angeles city service.

The interurban trains number more than 2000 every day; 75,000,000 passengers will be carried this fiscal year, and the gross earnings will be somewhat in excess of \$9,000,000.

Like nearly all the interurban systems of California, the lines outside of business centers of the cities are on private rights of way. The tracks are of standard construction, built for safe operation and speed equaling that of the steam lines.

VARIED CONDITIONS

The Pacific Electric operates lines under most varied conditions: its mountain division reaches Mount Lowe 5000 feet above the sea; its beach section follows the ocean shore from Port Los Angeles on the north to Balboa on the south, a distance of 55.70 miles, on almost a continuous coast line touching every seaside resort tributary to Los Angeles and unbroken except for the cliff section between Redondo and Point Fermin;

its valley lines are through orange groves and vineyards and along the foothills, with changing panoramas of snow-scarfed mountain ranges, towns orchard-encircled, and valleys green in cultivation.

The Pacific Electric operates railroads, amusement parks, wharves and docks, a hotel, the largest business block in Los Angeles, an observatory, a light and power business, a burro "short line," and, on a limited scale, joins its neighbors in ranching. It carries passengers in and out of the business center of Los Angeles in greater number every day than was the entire population of the city in 1900. If you were on a journey to encircle Los Angeles from ten to fifteen miles from its center you would cross more than twenty lines of this railway. It gives frequent and rapid express and freight service to each community it reaches; takes to the suburban resident before breakfast the morning newspaper; brings to town the milk from the dairy for the city householder before he is awake; returns the theater-goer to his home, wherever it may be, after the night performance; serves industries on an equality with the steam lines, both as to local and



THE ascent to Mount Lowe—one of the many delightful railway trips in Southern California. Every lover of natural scenery and altitudes hastens to visit Mount Lowe while in the southern part of this State.

transcontinental rates; carries annually 250,000 tons of beets to sugar factories; delivers to steam lines for Eastern shipment some thousands of cars of oranges and lemons from the twenty-five packing houses it reaches; takes the United States mail to every postoffice on its lines; operates daily sight-seeing cars the width and breadth of the territory served, that the Eastern visitors may know of the Southland; spends \$100,000 a year advertising the attractions along its lines.

It has 5000 employees, with a monthly pay-roll of \$350,000. During the last four years it has contributed to the paving and maintenance of streets in cities it serves more than \$1,500,000. Its expenditures in its operations and extensions of its lines during each year for more than twenty years have largely exceeded its gross revenues.

In the last decade every town served by the Pacific Electric, with not more than one

or two exceptions, has doubled in population; and the marvelous city of Los Angeles has, in fifteen years, quadrupled the number of its inhabitants.

AN IDENTICAL OUTLOOK

The growth and prosperity of Southern California and of the Pacific Electric are so closely interwoven that the outlook for one may well be said to be the outlook for both.

The relationship between the country served and its interurban systems elsewhere in California is much the same as that of the Pacific Electric and Southern California. It varies only in degree.

In the development of the Sacramento Valley in the last decade the Northern Electric has been a great factor; with its neighbor to the south, the Central California Traction Company, it has been one of the two greatest agencies in the marked development of Sacramento as a city (the other being the monthly influx of money which, in great vol-



The Old and the New—Electric line runs beside the old San Gabriel Mission

ume, the Southern Pacific distributes through its shop and other pay-rolls).

The Northern Electric operates some 200 miles of line with gross earnings of \$1,000,000 per annum. It carries 2,500,000 passengers per annum, which is more than ten for every resident of the territory served. Its lines extend northward from Sacramento to Oroville, Marysville, Chico, and Colusa, and westward to Woodland. On its main lines it operates eight or nine passenger trains each way daily, serving over ninety towns and smaller communities. Like the Pacific Electric, its lines are of standard construction,

and it gives passenger, freight, express, and mail service. The rich agricultural territory it serves is responding to its development, and with the carrying out of the reclamation and colonization work accompanying this growth, the Sacramento Valley will come into its own.

DEVELOPING FRUIT INDUSTRY

The Central California Traction Company, over a broad private right of way, links the cities of Sacramento and Stockton, some fifty miles apart, with a well built line. Completed within the last few years, it has served to develop one of the best fruit territories in California, and can now point to a record of over 1000 car loads annually of fruit for the East originating along its rails. With the Northern Electric it has served as an important factor in the development of Sacramento City. Both lines supplement the main city system with street car service. The Central California Traction Company is the bridge between the Sacramento and San Joaquin valleys. Its seven passenger trains a day each way between Sacramento and Stockton and additional service between Lodi and Stockton carry in the course of the year some 2,000,000 passengers (these figures including some street car service in Stockton and Sacramento), and the seventy-eight miles of road, even in this its pioneering period, are earning annually a gross revenue of over \$350,000. The business pulse of Stockton, that substantial, sure, and steady metropolis of the rich upper San Joaquin, has been greatly quickened by the construction of the Central California.

Stockton is northern terminus of the newest of the California interurban railways, the Tidewater and Southern, which extends southward through a rich farming territory to Modesto. Its thirty-six miles of line are yet too recently built to give much more than promise of development to come; but it is doing that which interurban roads find it often most difficult to do: at the very beginning it is building up a freight traffic worth while and encouraging intensive farm development.



Picturesque view of the ascent on the Mt. Lowe line

Over in the Santa Clara Valley and centering in San Jose is an interurban system serving that valley locally as well as is served any section with like conditions in Southern California. The Peninsular Railway operates nearly 100 miles of track, with some sixty-six road miles: Stanford University, Palo Alto, and the foot hill sections thence to Los Gatos are connected with San Jose and with each other; while to the east and west lines run to the principal mountain canyon resorts, Alum Rock Park, and Congress Springs. The Peninsular Railway operates a frequent service, carries annually some 3,000,000 passengers, and is developing a very considerable freight traffic. Its gross revenue this fiscal year will be approximately \$310,000. Its daily Blossom Route excursions are perhaps the best advertising the valley receives. Several thousand dollars per annum are spent by this company in advertising the attractions of the beautiful Santa Clara Valley as seen from its Blossom Route cars.

The Oakland, Antioch, and Eastern Railway is yet a pioneer in its field, having its line open to Sacramento from Oakland but little more than a year. It has over ninety miles of well built line, block signaled, and operates seven passenger trains each way daily between terminals. It is making marked effort to develop traffic in its territory. Statistics as to its operations in its development period would likely be old relatively before they could be printed. It occupies a territory between San Francisco and Sacramento heretofore largely without rail transportation.

The San Francisco, Napa, and Calistoga Railway traverses the beautiful Napa Valley from Vallejo to Calistoga. Its forty-five miles connect the towns of Calistoga, St. Helena, Napa, and Vallejo, and at the latter point a connecting steamer line completes the route to San Francisco. This line, well established for many years, serves principally the passenger traffic of the Napa Valley, which not only has a fairly dense resident population but is a section of charming re-

sorts attracting a patronage of wayfarers. It is also the route to lands of promise beyond. The Napa Valley line carries 750,000 passengers per annum and earns a gross revenue of upwards of \$250,000. It operates seven passenger trains each way daily, and handles freight and express traffic.

IN THE CITRUS SECTION

The Visalia Electric Railroad Company is a single phase alternating current line operating in the citrus fruit growing section in Northern Tulare County, its western terminus being Visalia. It serves Visalia, Exeter, Lemon Cove, Naranjo, and the Woodlake section, a citrus fruit country of great productiveness and rapidly increasing acreage. The Visalia Electric is one of the few electric lines whose freight traffic rivals its passenger revenue. Six passenger trains are operated daily between terminals with additional service between certain stations. Its gross revenue during the present fiscal year will approximate \$100,000, and it will carry some 150,000 passengers. It operates some fifty miles of line, of which sixteen are used jointly with the Southern Pacific Company.

North of San Francisco the Petaluma and Santa Rosa Railway operates some forty-three miles of line in the populous and prosperous Sonoma Valley, carrying some 800,000 passengers per annum with service of a dozen daily trains between Petaluma and Santa Rosa. At the former point it has a steamer connection for San Francisco. It is, aside from the Riverside, Rialto, and Pacific Railroad, the only electric line in the State which has a freight traffic almost double its passenger traffic as a revenue producer. This railway has been of great aid to its territory. It earns a gross revenue of over \$300,000 annually.

In some instances the interurban railways of California are auxiliary to the city systems. The excellent city street railway system of San Diego has associated with it electric interurban lines which are reaching into suburban territory.



Bath House and Auditorium at Redondo Beach, Cal., one of the watering places reached by the Pacific Electric lines

The San Francisco-Oakland Terminal Railways operates the street car system of Berkeley, Oakland, and Alameda in association with its transbay service, and has lines extending to Haywards and Richmond. The Southern Pacific's electrified Alameda County lines serve comprehensively that territory and San Francisco in connection with the transbay service. These two great electric systems of Alameda County this year probably will carry in and out of San Francisco with the aid of their ferry connections some 40,000,000 passengers. They provide one of the best of suburban services in the world. The Key Route operates 256 miles of line, and urban passengers included, will carry this year probably 90,000,000 people. The Southern Pacific lines operate 100 miles of track; the service is devoted chiefly to transbay traffic and carries somewhat the larger part of that traffic, while the Key System, in addition to its transbay service, provides all of the urban service on the Alameda side except that of one route.

The Northwestern Pacific operates an ex-

tensive electric line service in Marin County in connection with its ferry service between San Francisco and Sausalito. Without any question whatever, the electric lines of Alameda and Marin counties have had immeasurable influence in territorial development. Were these systems to disappear it might reasonably be said that the disaster would hardly be exceeded by devastation of the communities by some widely destructive calamity. So vitally interknit are the destinies of these communities with their electric railway service that it would be hard to conceive the existence of a major part of them without such service.

Riverside, Rialto, and Pacific Railroad, operating between Rialto and Riverside, a distance of some ten miles, has a very heavy freight traffic due to the cement works located on its line, and is prosperous accordingly. Its passenger traffic is carried on by the Pacific Electric under contract which also grants to the Pacific Electric trackage rights for through service over this line as a bridge. Glendale and Eagle Rock Railway is a con-

nection with the Pacific Electric extending northward from Glendale into the very charming Montrose-La Canada section with a branch eastward into the Eagle Rock Valley. Monterey and Pacific Grove Railway has five and one-half miles of line connecting the cities of Monterey and Pacific Grove. It is an institution that has been very valuable in the growth of these towns, especially in a resort way. It carries nearly 1,000,000 passengers per annum and receives from each only a street car fare. Fresno Traction Company is operating an interurban line north of Fresno to the new State normal school and thence through a very fast growing section to the resorts on the bank of the San Joaquin River, a total distance of about ten miles. The Bakersfield and Kern Railway, operating a first class system between Kern on the Southern Pacific lines and the city of Bakersfield, might properly be classified as an interurban line, although earning an average of only 5 cents per passenger carried. The United Railroads of San Francisco has one suburban line extending fifteen miles south to San Mateo. The principal San Diego electric suburban line is a five-mile extension to National City and a line to Point Loma. The Los Angeles Railway operates suburban lines to Inglewood and Eagle Rock.

It is not intended in this paper to deal with urban systems, but nearly every street railway system in the State has lines that might properly be classified as suburban lines.

The revenue to the State and the cities through taxation of interurban and suburban earnings of the electric lines is probably not far short of \$2,000,000 per annum and, in addition, the interurban lines, where using the city streets, are further indirectly taxed for parts of the streets occupied and their maintenance.

While the interurban systems have unquestionably been of very great value in the progress of California, the railways themselves can be hopeful only in feeling that they are in a pioneer period. Practically none is as yet earning adequate interest upon the money actually invested therein, whether it be



Peninsular Railway substation at Los Altos



Type of passenger cars in service on Peninsular line. These cars cost from \$11,000 to \$12,000 to build



Trackage near Mayfield, past level fields of verdant green



Substation at Saratoga, Cal.

through stock or bonds or be carried as a floating debt. Some are fortified financially by having the major part of their investments made through stocks, and others as best they can must meet the fixed charges which come with large bond issues and hope patiently for better times. The public, in its own interest, not only with the hope for future extensions but the desire to maintain the present high standard of service that nearly all of these interurban lines give, should keep in mind that adequate support and protection of these lines is as necessary to the public interest as to that of the stockholder and bondholder.

The California interurban railways can rightly claim a high standard of operation. The service is uniformly good. These companies have not only been among the first to adopt improvements in their art, but many of the best features of electrical operations in this country today are of California creation. We have in California the very best and latest designs of interurban cars, the latest improved block signal systems, and road crossing protective devices. Such features as the third rail, light signal system, the pantagraph trolley, and catenary overhead construction have here been early adopted. California has pioneered in equipment designs. Its interurban equipment was among the first to have the steel under-frame, and in the matter of all-steel cars it has likewise pioneered. Just as the electric railway street car was first practically put into service in California and just as California was the place of development of the long-distance electric transmission lines, so it has been first in interurban railway development. The 600 and 1200-volt direct current lines, and as well alternating current lines, are in operation in this State. The electric railways have, in large part, supplied the markets necessary to make practicable the great electric water power develop-

ments in our mountains and the transmission of such power followed practically not only every city but every hamlet in the State. They have, on the other hand, also, provided a source of revenue to the oil producers and have helped to create that industry. A very large part of the power consumed by the electric railways is derived from California oil.

Whether or no the growth of the interurban electric railways shall continue is at this time uncertain. They, and the street railways as well, must be kept on an equality as to taxation with their new competitor, the automobile. The State, the cities, and the towns are providing free roadbeds for the automobiles, and at this writing these are being commercially operated with but little regulation, no recognized obligations to the public and, compared with the electric railways, extremely light taxation. Such conditions might reasonably be expected to be attendant upon such recent development, but it is unthinkable that the public should long permit transportation systems, upon which it very properly relies, to be crippled or driven out of business by a new system which may utterly fail when, having taken on the business of the electric railways, it has then to assume likewise the burden of their obligations and their taxation. The public must also realize that with the increasing taxes and greater costs of operation that have come to the electric railways in the last few years not only can present fares generally no longer be reduced but in some instances may soon have to be raised.

It is to the interest of California that its electric railway systems should be prosperous, for only prosperous roads can maintain really excellent service, and only prosperous roads can create those extensions which are of such benefit to the sections served and to the State as a whole.

What Railroads Are Doing in California

By E. O. McCormick

Vice President Southern Pacific Company

Editor's Note: Mr. McCormick is amply qualified to discuss the broad question of railway activity in California in a fair and convincing manner. He not only has *ex officio* the point of view of the great corporation with which he is connected and of other railways, but he has also thorough acquaintance with California industrial conditions from long residence and from very wide acquaintance throughout the State. Personally he is known as a man of broad sympathies and information and disposed to be fair in his judgment on public questions. The importance of his article will be recognized by those who realize the importance of the railroads to the country.

IT WOULD be easier and shorter to say what the railroads are not doing in California.

Transportation is the lifeblood of all human enterprise. Without transportation things may have value to the owner. But they have no selling prices. A sea otter's skin is of value to an Eskimo because it will keep him warm. But a bear skin is just as valuable. Transported to London the otter skin sells for as much as \$1500, the bear skin for not over \$50. Transportation added to both skins an increased selling price and at the same time enormously altered their relative prices.

What transportation does to the Eskimo's pelts it does in varying degrees to everything that men own, grow, make, use, trade and buy and sell. It is the arbiter of all fortune, the wellspring of all prosperity, the fundamental basic factor of all progress, all comfort, all commercial and individual wealth-making.

INCREASED PROPERTY VALUES

In the forty years from 1875 to 1915 the value of property of all kinds in California in-

creased from six hundred millions to six thousand millions—1000 per cent, or 25 per cent per annum. The railroads caused this increase. Were there no railroads in California, there would be no greater values than there were forty years ago.

The increase in the total realty values in these forty years was almost exactly \$4,000,000,000. Of course, I speak of true values, not assessed values. So that the transportation and marketing facilities provided by the railroads have increased the values of California's real estate an average of one hundred million dollars each year during forty years.

During these years the railroad with which I have the honor to be connected was commonly spoken of as the Octopus by persons of mild disposition, and as the Sum of Human Villainy by gentlemen who nursed aspirations to certain forms of popularity. Looking over the figures I have given, it may possibly occur to dispassionate persons engaged in making a living in some kind of business, that an annual visitation of an Octopus or even of a Sum

of Human Villainy could be welcomed with considerable satisfaction.

What the Southern Pacific has done for years it is still doing in California.

It is employing thousands of workmen and paying them higher wages than men are paid for like services anywhere in the world. About one person in each fifteen of the population of California is dependent for his or her living upon the wages disbursed by our company.

It is paying into the State treasury for the support of public institutions and the conduct of State affairs the great sum of approximately \$3,000,000 per annum.

It is developing the great communities about the Bay of San Francisco by a system of ferries and interurban electric roads over which commuters are carried as high as twelve miles by water and rail for a uniform fare of 5 cents. And it is sustaining the losses incurred by giving this service at $\frac{1}{2}$ cent a mile, or one-fifth regular railroad mileage rates, because it looks forward to developing communities so populous that even these low rates will ultimately be profitable.

It is constantly carrying on a widespread and costly campaign of advertising in America and foreign countries to induce immigration of desirable settlers to California—thus adding to the volume of population, business, agriculture, wealth and land values.

It is stimulating development and values and trade by hauling goods in and out of California at freight rates which are cheaper than those in any other country and which are just about one-half the rates charged per ton mile by the government owned railroads of France, Germany, Italy, and Austria and by the privately owned railroads of Great Britain.

IMPROVING AGRICULTURAL METHODS

More particularly, the Southern Pacific Company is fostering by every means in its power, and as far as the State commission, by reason of the laws, permits, the work of improving agricultural methods of production and the consequent profits of the farmers.

This is a subject in which our road, as well, no doubt, as other roads, is deeply and anxiously interested. Our impelling motive is

the selfish one of increasing our own freight business and our stockholders' profits. But this does not alter the fact that it is a great public service we are endeavoring to render. Personally I should be very careful not to hinder the man who was trying to make money for himself which he could not make without making money for me first, and that is exactly the situation the railroad and the farmers are in so far as this effort to better farm production is concerned.

The interests of the railroad and of the farmer are powerfully reciprocal. The only way the farmer can make money is by getting his products to market. The railroad makes its money by hauling the farmer's products to the markets. Evidently, the more products the farmer can raise and the more markets he can get them to, the more hauls the railroad has and the more money both make. So we, on the railroad end, are doing our best to help the farmer grow bigger and better crops and to find more and better markets for him to sell his crops in. There isn't any philanthropy in this. It simply appeals to us as good business all around.

At present, our activities are limited, by external control to narrower bounds than we should limit them if free to follow our own desires. They consist chiefly in co-operating heartily with the excellent work of the State Agricultural College; carrying the representatives and instructors of that institution wherever they care to go free of charge; providing transportation for exhibits at the fairs and persistently spreading bulletins and helpful publications on agricultural topics—scientific lectures and text books on horticulture, cultivation of olives, of oranges, intensive small farming, poultry raising, hog raising and kindred farm industries.

The railroads are also doing all they can to excite public interest in the creation of a system of rural credits—such as that which so admirably meets the farmers' needs in Germany.

CO-OPERATIVE MARKETING

We hope, too, to see some system of co-operative marketing devised, by which we

can distribute the farmers' products more directly to the consumers, thus benefiting both and ourselves, also.

But, first of all, comes in importance the task of educating our farmers to get the maximum of production from their lands. Acre for acre, the California farmer does not get anything like the crops or the net profits from his land which the European farmer gets.

The advantage of intelligence and of alertness lies with the California farmer. So the trouble must be found in inferior methods. And to show the California farmer how to better his methods and his results is the problem which intensely interests California railroad men.

There is another service which we are trying our best to render to ourselves and to the commonwealth. That is the cultivation of different and better feelings between the railroads and the people.

Evidently it is not good for the roads or the people that the great basic industry of the State should be held in distrust and in sullen prejudice.

For a generation the cultivation of suspicion and ill-will towards railroads was the stock in trade of a certain class of citizens. In those days those who could not jimmy themselves into a place on the blackmailers' payroll, assumed the equally profitable guise of defenders of the downtrodden public against railroad rapacity. It was a rather cheap trick, but it seldom failed. And it had the result of forcing every railroad in the country to do more or less politics in self defense. Every

session of legislatures saw this or that politician with a "cinch bill" in his pocket, ready to pose as a popular defender unless he could get his price. That it was a mistake to yield to these hold-up demands I think we are all now agreed. But it seemed to the railroad men of those days the easiest way out of trouble.

It is a hard job to remove deep-rooted dislike—some of it founded on falsehood and some of it founded, no doubt, on truth. It takes time to make friends of enemies, even though the cause of enmity is removed and the mutual benefit of friendship is plainly apparent. Whatever promotes mutual understanding and mutual good will and respect, promotes the profit of all concerned.

I believe, however, that the policy of courteous treatment of complaints, of promptly remedying real grievances, of fair dealing with all shippers, big and little, of helpful aid willingly rendered, of expensive efforts to advertise and build up the State, of doing our best to provide manufacturers and farmers with new markets—in short, of railroading alone and railroading for all it is worth and for the benefit of all, has in a marked manner affected the once bitterly hostile attitude of the public toward the common carriers.

To change that attitude entirely, to replace hearty dislike with hearty good will, to bind the railroads and the people together in mutually helpful bonds of amity and sympathy, is one of the great things which the railroads are trying to do in California. In my opinion it is the greatest thing we are doing.

“THE railroads are the greatest employers of labor in the United States. One million five hundred thousand people are here employed by railroads, while more than two million people are employed by industries that supply railroads. If on the average each employe has three persons dependent upon him, then ten million five hundred thousand persons are supported by the railroads, or about one-eighth of the population.”—*A. E. Stillwell*.

The Development of Transportation in California

By Seth Mann

Attorney and Manager of Traffic Department, San Francisco Chamber of Commerce

Editor's Note: Mr. Seth Mann, who has for years studied the problems involved in the efforts to find solution for them, discusses transportation in its relation to California industries and development. The early beginnings in transportation are considered, and in a wide sweep from the pioneer days to the present time Mr. Mann touches on the varied modes during the entire intervening period and sums up with a consideration of the effects of the canal upon commercial and general transportation as related to this State. The subject is handled in a masterly manner and in analytical fashion, the result of that quality of the mind engendered by the pursuit of the law as a profession.

AN OUTLINE of the development of transportation in California may well commence with the landing of the first Pacific Mail steamer on February 28, 1849. In these days of '49 the only freight service was by means of the ocean highways. The fleet of clipper ships carried much of the merchandise around Cape Horn. They were of about 1700 tons burden and required 90 to 120 days to make the trip. With the advent of freight steamers operating around the Horn the clipper ships disappeared. The building of the railroad across the Isthmus of Tehuantepec in Mexico, reaching from Puerto Mexico on the Gulf of Mexico to Salina Cruz on the Pacific Ocean, opened a new route for water transportation between the Western and Eastern coasts of the United States. There were

then three, or perhaps four, water routes, if the Straits of Magellan be considered separately from the Cape Horn route; that is, these two routes around South America, and the two isthmian routes by way of the Isthmus of Tehautepec and the Isthmus of Panama, over which short lines of railroads ran. Each of these two classes of water routes had their relative advantages and disadvantages. For example, the steamer coming around the Horn or through the Straits of Magellan would consume twice or thrice as much time as steamers operating via the isthmian routes; but, on the other hand, the cargo would arrive in well-nigh perfect condition, while the cargoes out of the steamers on the isthmian route were subject to loss and damage due to the two transfers from ship to rail and rail to ship again.

The opening of the Panama Canal last August has perfected the coastwise water routes by establishing a substitute by way of the canal which meets and overcomes the former difficulties of time and disturbance of cargo. The cargo moving through the canal is loaded at point of origin and is untouched until the point of destination is reached. The time consumed between the coasts has been materially lessened. The time over the old isthmian routes was a minimum of about thirty days. The minimum via the new isthmian route should reach twenty days when the canal has settled and the handling of ships through has been brought by experience to its highest efficiency. This may take one year or possibly two. The full effects of the canal upon inter-coastal water transportation can not be expected to develop in six months nor in a year. Commercial conditions, disturbed and complicated by the present European war, must return to normal before canal transportation can begin to develop in any real sense.

ABNORMAL CONDITIONS

Westbound tonnage increased instantly upon the opening of the canal from 300,000 tons per annum to 900,000 tons per annum. Freight offering to the canal lines is so far in excess of their tonnage capacity that they recently decided upon an advance in rates, and notwithstanding these apparently encouraging conditions, some vessels of these lines are being diverted into the European trade, so attractive and irresistible are oversea rates on cotton, food products and the like, that have been boosted sky high by the war. This is one instance of the abnormality of present conditions of canal transportation. The great freight offerings should cause an increase of the number of vessels engaging in trade, instead of which their number is diminishing. This, however, is but temporary, and it is even now announced that five new modern freighters are contracted for, destined for the canal trade.

There is nothing visionary about the Diesel engine, which instantly converts crude petro-

leum into power. It reduces fuel cost nine-tenths, or putting it the other way, the fuel cost of a vessel propelled by a Diesel engine is one-tenth of the cost of the coal used by a steamship of equal tonnage. This is claimed and demonstrated. There are no Diesel engines driving vessels in this coastwise trade at present. It is safe to predict, however, that not long after the close of the war, many such vessels will enter upon this traffic. Nor is it a misty vision that sees these vessels making tri-weekly or even daily sailings from San Francisco and New York.

The large and growing commerce with the islands of the Pacific Ocean and with the Orient is effectually handled by a number of well-equipped steamer lines with regular sailings to and from San Francisco. There is also steamship connection with South American ports.

TRANSCONTINENTAL RAILWAYS

The golden spike that united the Central Pacific with the Union Pacific rails at Promontory, Nev., April 28, 1869, was the fulfillment of a conception that was thirty years in its realization. It is said that the pony express which operated in the 50's and early 60's between California and Utah, demonstrated that a railroad over the Sierras was practicable. In any case, the roads were joined and a transcontinental rail line was in operation in 1869. It was the only line for many years. Later the Southern Pacific Railroad Company extended its line to El Paso, and the Southern Pacific company now operates from San Francisco to New Orleans and Galveston by rail and thence via the Morgan Steamship Line to New York. The next transcontinental line to enter the State was the Atchison, Topeka and Santa Fe, which operates from San Francisco to Chicago and also via Galveston and the Mallory line of steamships to New York. The San Pedro, Los Angeles and Salt Lake line, operating from San Pedro through Los Angeles to Salt Lake City, followed, and then a few years ago the Western Pacific completed its line from San Francisco to Salt Lake.

With these four transcontinental lines of railroad, California is well served. Rail con-

nections to and from all rail points in the United States, Canada and Mexico are furnished to substantially every city and town in the State.

CALIFORNIA'S REGULATION OF PUBLIC UTILITIES

Within the limits of this sketch the history of the origin and enactment of the present provisions of the state constitution and statutes dealing with the regulation of public utilities can not be contained. Yet in the short space of three years one of the best, perhaps indeed the best system of such regulation prevailing anywhere, has been drawn with the greatest care and enacted into the constitution and statutes of this State. The work of the California state railroad commission is widely known. While it has control of public utilities generally, much of its most important work has been and is concerned with the adjustment of railroad rates and practices.

The work of such commissions is of necessity continuous. Varying conditions and circumstances will always require the beneficent activities of regulating tribunals. California, however, is fortunate in the possession of a railroad commission composed of men of the highest type of character, intelligence, knowledge, and judicial fairness, as well as great industry.

The result has been that in the few years that this new commission has held office it has accomplished a great part of the work of establishing rail tariffs throughout the State that measure up to the requirements of reasonableness and equality.

The transportation facilities and possibilities of California are unexcelled. California is well served by both rail and water. The Panama Canal has solved the last remaining problem. The water and the railways are open and so are the waiting arms of California to all her sister states and to the world at large.

THERE was a time, in the long ago, when the ox team or the stage coach supplied the only available means of transportation across the great stretches of country. Henry David Thoreau, viewing the rumbling iron steed that supplanted the older forms of conveyance, apostrophized the power of steam. Even in those early years he foresaw the great advance that would be made through these newer means for transportation. Today steam is still a monarch, though sharing the throne of power with another—Electricity. And even gas has claimed a position at least of henchman to these two mighty powers. A state or a country is the greater for its railroads and railway systems. California is splendidly equipped in these respects. There are few even remote corners whereto the railroads fail to penetrate. To the farmer the matter of transportation is all-important. He may rest easy on that score in California. His needs are supplied. The city dweller is likewise favored—the street railway systems of all the important cities of the State are adequate. The problem of transportation is a problem no longer.

Light and Power of California

By John A. Britton

*Vice President Pacific Gas and Electric Company; Regent University
of California, Etc.*

Editor's Note: Mr. Britton sketches pointedly the relation of electric power to the upbuilding of industry and discusses broadly the progress of the development of hydro-electric power as the ruling factor to the recent industrial development of California. He shows that California was the pioneer in the development of hydraulic electric energy for commercial purposes, and forecasts eloquently the result of the full development of our resources, which have as yet been only touched upon. He shows that though now the State is cobwebbed with electric light and power wires, we can claim a development of not more than 1,000,000 horse-power, both by use of steam and stream, while eight or ten times as much hydro-electric power is locked alone in the heart of the Sierra, whence flow our powerful streams.

ELECTRIC power is universally recognized as the great modern up-builder. It is used to develop entire communities in every department of enterprise, commercial, industrial and agricultural. It is the trusted friend of the miner, the manufacturer and the domestic economist. It is in a great measure responsible for the hum of industry that is heard from end to end of this great country. Its relation to the world's progress and development has been thus significantly described by a Western engineer:

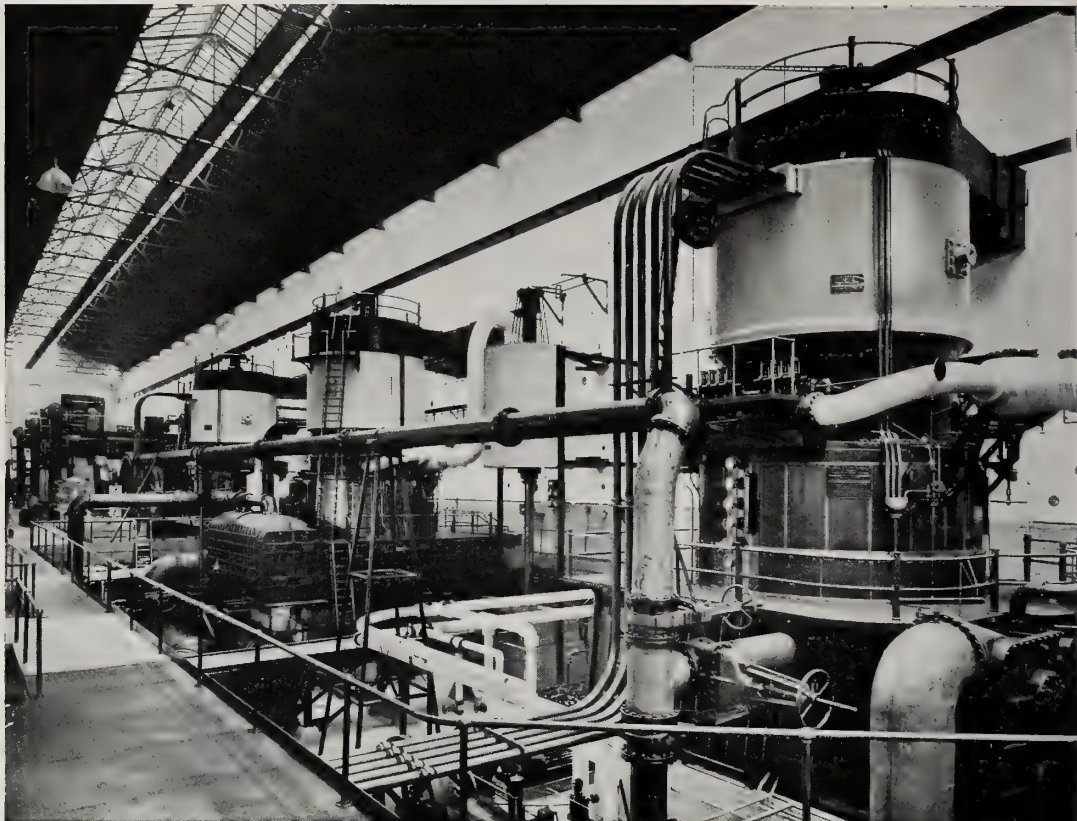
"The civilization of the future will be measured by the consumption of kilowatt hours per capita."

Of course it must be generally understood that for electric power to be of universal benefit it must be cheap electric power, that is to say, it must be capable of generation and distribution at a price that places it within the

reach of the ordinary, everyday consumer. Early electrical research did not develop its practicability in this respect, perhaps, but from the day when the almost illimitable scope of this mysterious energy's usefulness first, however dimly, dawned upon the minds of the scientists, the inventive brain of man has been working steadily toward the practical end. The result is to be seen today in city, town, village, hamlet, every place, almost, inhabited by mankind in what is known as the civilized world; and, with improvements constantly reducing cost of production, the use of electric power is spreading in every direction.

QUESTION OF COST

It becomes, then, a question of how this electricity can be generated and distributed at least cost to the producer, that he, in turn, may dispose of his output at the most reasonable price to the consumer. The answer to



A steam electric plant—Three turbines (two of 20,000, one of 15,000 horse-power capacity) in the foreground. Pacific Gas and Electric Company's station at the Potrero, San Francisco

this question is found in the headwaters of the mountain streams, in canyons and gorges where the snow-waters precipitate themselves down steep hillsides to turn wheels in the power houses below. Cheap electric power, in this section of the world at least, for the most part means power developed by hydraulic process and sent on its mission of usefulness along high tension wires across country to the marts of trade many miles away. In some communities hydro-electric power is unknown, as yet, and in all big cities steam electric plants are almost a necessity to absolutely insure the quality of service indispensable to great centers of population as well as to reinforce that which the mountain streams provide; but though—taking California as an example—the development of the oil industry in recent years has provided a fuel less costly than coal, it can not be said that in the matter of economy the steam engine can successfully compete with the waterfall.

In this golden State of ours the hydro-electric development of electricity is growing by rapid stages and to it already the miner, the farmer and the manufacturer owe a boundless debt of gratitude. It was not until the men of resource and daring invaded the fastness of the mountains and compelled the snow-waters to do their bidding that the industry of mining, which since the passing of the "flush" times had been steadily languishing for want of available power, sprang into renewed activity; that the agriculturist, who since the days of first occupation had toiled from dawn to dusk for but a scant return while waging incessant warfare against flood at one season of the year and drought at another, found himself suddenly lifted into a state of ease and plenty; that the manufacturer, whose presence on the Pacific Coast has been as scarce, almost, as that of the snow-ball in a place it is not always considered polite to mention, began to dot the landscape with his

factories. And what electricity has done and is doing to lighten the household burden is too well recognized to need dwelling upon here.

Hydro-electric development in California, too, goes hand in hand with conservation, in the most liberal and best accepted interpretation of that term, and not, as the political extremist would have the people believe, in opposition to it. The vast storage reservoirs that form part of this system of development are priceless benefactors to whole communities in a section of the country where there is a total absence of rainfall for many long months. During that period, when the snow-waters have poured oceanward and rivers are low, vast tracts of fertile lands would prove barren and unprofitable for want of sustenance were it not for the irrigation ditches that are fed by the stored waters. Few power companies there are that do not, in addition to supplying the electric energy that feeds mine, factory, farm, and home, furnish the water that means life to those sorely in need of it. This is an appreciable item in the reckoning on the side of electric development by hydraulic means.

Of course, it must not be thought for one moment that the electric industry is fully developed in California as yet, any more than it is anywhere else in the world. We can claim, however, for our Golden State that she was the pioneer in the development of hydraulic electric energy for commercial purposes. Not so long ago, either, for it was in 1895 that the completion of a small power plant on the American River near Folsom enabled the transmission of electric energy along high-tension wires from that town to the city of Sacramento, twenty-two miles distant. This,

though not quite the first successful demonstration of electric transmission, afforded the first instance of its practicability for commercial purposes. Since that time developments have followed one another in quick succession and today the State of California is cobwebbed from end to end by a network of wires along which the mysterious "juice" hums on its errand of usefulness.

And yet, the natural resources of our Wonderland of the West have not been drawn upon to anything approaching the limit of their capacity. There is electric power locked up in the snows amid the peaks of our long mountain ranges capable of development to the extent of between 8,000,000 and 10,000,000 horse-power, according to the percentage in efficiency which is the basis of calculation, and



A power house in the mountains—De Sabla, on Butte Creek, Butte County, California

against these stupendous figures, given us by the forest service branch of the United States Department of Agriculture, all we have to record, so far, for the progress of hydro-electric development in California is a string of water-power systems aggregating in capacity less than 600,000 horse-power. To this total must be added that of the steam-electric plants above referred to and which are capable of developing, in the aggregate, 355,525 horse-power. So then, counting hydro-electric and steam-electric developments together, we have an aggregate of less than 1,000,000 horse-power of electricity developed for commercial purposes in the State today.

That these figures will be materially increased in the near future goes without saying. The day of California's opportunity is dawning. Out here in the West the sun shines upon peace and prosperity, and the omens are for a great awakening to the enormous advantages which this section of the country offers to the settler over and above any other section. New industries are springing up every day, and there is no limit to the productive capacity of the soil. This is an age of development; development means investment, and investment means the stability that spells prosperity.

Let the reader look for himself and see conditions as they are developing today in our Golden State. As he journeys through its great valleys he may see on all sides of him large farms being cut into smaller tracts and each tract farmed more or less intensively and planted to trees, vines, alfalfa, garden truck or some other crops that bring immediate and large returns to the farmer. As he looks farther he will find that a most important thing in connection with this intensified farming is the application of water to the land. Recent developments in the rice industry in the Sacramento Valley are in attestation of that fact. If he goes yet one step farther in his investigation he will find that in the great majority of instances, the percentage increasing daily, the water is being pumped from wells and the pumping plants driven by electric power.

Irrigation is not a new thing; neither is reclamation; but both sources of prosperity to the tiller of the soil in California were, to all practical purposes, uncertain quantities until that great up-builder, that greatest of all developers, cheap electric power, was made available, and the legend, "Electricity on the farm," came to be generally inscribed upon the banner of interior development.

ELECTRICITY AND PROGRESS HAND IN HAND

The farming industry is particularly in our minds just now, for from end to end of our Golden State there are long, sweeping valleys of astonishing fertility that call for but intelligent cultivation to yield returns in boundless abundance. The finger of opportunity points to those valleys. The legend, "California invites the world in 1915," meets the eye of the traveler East and West, North and South, in every section of the civilized world. The completion of the Panama Canal and the great universal exposition that is being held here in celebration of that greatest of great engineering achievements must bring thousands from the East and abroad to take this chance afforded of settling in a land so favored as ours. The enormous boundless natural resources of our State will be drawn upon more and more and electricity, electric power, will be the chief aid to this process of development of our natural resources. The power companies throughout the State know this and are preparing to meet the demand. They, like the farmer, like the miner, like the manufacturer, like the merchant, like the householder, have their investments to protect and to realize upon. The aggregate investment of the power companies operating in California today reaches nearly \$325,000,000 and their securities are in the hands of the public both at home and abroad. It is to their interest that this State of ours shall develop in every direction of industry. To the common benefit, then, shall electricity and progress walk hand in hand through the ages to come.

"Do it electrically," is the adopted slogan of a great Eastern appliance house. It speaks for California just now.

California as a Field *for* Farm Mortgage Investment

By Norman Lombard, S.B., LL.B.

*Manager Agricultural Credit Corporation of California; also Member Committee on
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Editor's Note: Credit based upon agricultural security is a phase of finance today that is becoming more and more important to both the producer and the investor. Mr. Lombard has made this a study and his present knowledge of the subject may be said to be authoritative. The principle of the rural credit system involves the promotion of prosperity among food producers as well as the supplying of a means of employment for capital seeking safe and long-term investment. California laws now favor organization for rendering good agricultural security more effective in securing the capital which is needed for the promotion of the industry and the advancement of the State. Mr. Lombard discusses California as a field for farm mortgage investment with attention to detail.

IN explaining just exactly why I consider California to be the ideal farm mortgage investment field, I will divide the subject into the following divisions:

A—The Topography and Geography of California.

B—California Climate.

C—The Nature of the Products.

D—The Character of the Land.

E—The High Class of Agriculture.

F—The Water Supply.

G—Land Values.

H—California Laws.

Subdivision A: Topography and Geography:—A glance at one of the pictorial relief maps contained in "The California

Almanac" will assist the reader in understanding some of the statements which follow. It will be noticed that along the coast of the Pacific Ocean there is a range of mountains—again along the eastern boundary there is another range, the Sierra Nevadas, containing the highest peaks in the United States. These two mountain ranges form the natural boundaries of the tremendous bowl which extends throughout the interior of the State, and it is within this district that the great agricultural industry of the State finds its home.

This great interior valley of California has been divided in local parlance into

two parts, the northern end called the Sacramento Valley and the southern end the San Joaquin (pronounced San Wah-keen) Valley, the respective parts being named after the rivers which drain them. Throughout the great extent of this magnificent valley, agriculture is practiced in its most highly developed and most intensive forms. The land has a slope of about one foot to the mile, affording excellent drainage and it is abundantly watered from the melting snows from the Sierra Nevada mountains to the eastward, as will be more fully explained under the heading "Water Supply."

Of course, it must be understood that there are other splendid agricultural districts but space cannot be taken to describe them all in detail in this article as they have been fully covered in other parts of this book. We will mention however, the wonderful orange growing districts in the vicinity of Los Angeles; the great Imperial Valley in the southeastern corner of the State; the Inyo Valley in the east-central portion of the State, (where Los Angeles obtains its water supply); and the coastal country, extending from Eureka on the north to San Diego on the south, comprising the narrow strip of country between the ocean and the Coast Range mountains throughout practically the entire extent of the sea coast of the State.

Subdivision B: California Climate:—Throughout most of the agricultural districts of California snow is hardly ever seen, the winters are just sufficiently cold to make a light overcoat comfortable and the summers have sufficient temperature to put the "sugar in the raisin and the bloom upon the peach." Even though the mercury may run high in interior situations, the dry air prevents the heat from being oppressive.

The rainfall is confined almost entirely to what are known as the winter months, so that from say April to September, the

farmer can count upon clear days in which to mature and harvest his crop, and it is this condition also which makes possible the dried fruit industry of the State, the fruit being cured and dried in the open sunshine. The splendid climatic conditions also make for long-growing seasons for crops and inexpensive winters for stock and people, factors which contribute very largely to the prosperity of our California farmers.

Subdivision C: The Nature of the Products:—The equable climate, the long-growing seasons, the freedom from early fall rains, the lightness or practical absence of frost, the fact that water can be had where and when needed and the soil conditions existing in California, all make possible the production of unusual crops which command the best markets and the best prices; for example: oranges and lemons, prunes, grapes, pears, peaches, figs, olives, dates, almonds, apricots, etc.

These crops are all grown in considerable quantity in California and each forms the nucleus of a very profitable and successful industry. It must not be supposed, however, that these are the only crops produced in California: they are, perhaps, more written and talked about by tourists and visitors than other crops, but that is only because they lend themselves better to descriptive literary efforts. California also produces its crops of wheat, barley, beans, alfalfa, potatoes, cotton, corn, rice, etc., not forgetting commercial vegetables in large amounts, as will be understood by any one glancing through "The California Almanac." The live stock, dairy and poultry interests are also very large.

As to those crops which reputation has designated as peculiarly Californian, it should be noticed that they are staple and easily marketed, being shipped to all corners of the globe and to every state in the Union, dried, canned, preserved or fresh. They furnish during the winter

months the supply of fruit which is necessary to the continued health of humanity, so that the demand is constantly increasing. These crops are handled by our California farmers in bulk by the ton and wagonload, just as corn and wheat are handled in the Middle West. The farmer's dried fruit and nuts may be stored without impairment until prices favor selling.

Consider the great diversification which exists in our California agricultural industry and note that this diversification is an element of the greatest strength when considering California as a farm mortgage investment field. A total failure of all the crops is impossible in California owing to the fact that these crops are grown under such varying conditions that it would not be possible for nature to be adverse to all of them. Again, a failure of markets is impossible in California, because of the great variety of crops; it might be possible to conceive the failure of the market for one particular crop, but when it is considered that almost every crop which is grown in the temperate zone is produced on a commercial scale in California, it will be seen that in order to have a total failure of markets in California, it would be necessary for the farmers in the entire country to fail, an economic condition which history has never recorded, and which is outside the realm of practical possibility. California, therefore, being assured of a market for its crops, has that certainty of income which makes for uniform land values and hence for few foreclosures.

Subdivision D: The Character of the Land:—It is a well known fact that the soil in countries of small rainfall is much richer in plant food and much more productive than the soil in the humid districts. This is because many of the plant foods in the soil are soluble. In those parts of the country where the rainfall is heavy the plant foods are, therefore, washed out as fast as they are produced,

while in the arid districts the processes of nature create these plant foods faster than the scant rainfall is able to carry them away. All of our California soil is abundantly supplied with essential plant foods and in only a few of the districts, districts where only the top few inches of soil has been scratched and where the same crop has been grown continuously for years, or where heavy feeding crops are grown, are our farmers required to use commercial fertilizers.

Subdivision E: The High Class of Agriculture:—It may naturally be supposed that the combination of great soil fertility and splendid climate with water, when and where needed, in a country where the greater part of the farming region is free from drought and also from flood, would cause a high class of agriculture to maintain, and it is a fact that the class of men engaged in the agricultural industry of California is absolutely unique, containing as it does, men from almost every profession, including lawyers, doctors, retired business men, etc., men who have been students all their lives and who find in the California type of agriculture an opportunity for the profitable employment of all of the brains they possess.

The University of California is a most active agent in promoting intelligent farming in California. Several experiment farms are maintained and special schools are operated upon several of these farms for the purpose of training and instructing farmers in the proper methods of conducting their work.

Again, the university assists with expert advice when such may be needed; as, for example, in the study of soils to determine their particular adaptability for special crops; in the study of insects, in assisting to combat those which may be harmful and in various other ways.

Subdivision F: The Water Supply:—As a tool in the hands of our California

farmers, however, nothing transcends or even closely approximates irrigation in value. The California farmer has water just when he needs it and just where he needs it, and controls his supply as completely as does the city man when he sprinkles his front yard. By the skillful application of water or the equally skillful withholding of the same, he can influence the maturity and character of his crops so as to make the most profitable market, and he is also enabled to grow special crops which it would not be possible to produce under conditions where the water supply is not under absolute control.

Irrigation water is derived from the melting of the snows and from the natural seepage of water which has been stored up in the higher lying lands during the winter rains. During the winter months a steady, never-failing current of warm, moist air drifts eastward off the Pacific Ocean across the State of California. When this air strikes the cold altitudes of the Sierra Nevada mountains, it is chilled and the moisture precipitated in the form of rain and snow upon the foothills and mountains; the canyons and passes of the mountains furnish reservoirs for the storage of the snow and ice, which gradually melts during the succeeding summer and is taken out of the rivers at the lower levels, and by means of ditches, led on to the land where it is used by the farmers.

Some people look upon irrigation as an uncertain thing. This has come about because of the failure of certain bond issues upon irrigation systems. It should be noted, however, that these failures have resulted, in almost every case, from the incorrect estimates of engineers as to the cost of installing the necessary engineering works. There is no element of doubt on the irrigation question after the plant is once installed and in working order. A little consideration will convince the most

skeptical of the truth of this. Irrigation removes one of the greatest hazards to agriculture as practiced in other parts of the world and the California farmer enjoys the natural benefit in increased crop yield, in the security of his crop, and the greater profit to be derived from agriculture under such conditions.

Subdivision G: Land Values:—Unfortunately, upon this subject of land values there is considerable misinformation due to the tendency of tourists and visitors to write to their friends about anything unusual which may come to their notice. Thus the fact that Southern California orange groves have brought from \$1,500 to \$2,500 an acre has created an impression that all of our California land values are upon a similar level. This is far from the truth. The selling prices of our California agricultural lands which are devoted to grain, alfalfa, and ordinary fruits, are not as high as similar land in other parts of the country, and when one considers the great productiveness of these lands, it can easily be seen that there is still room for increase before our California lands will be upon the same basis as land in other parts of the country, income considered.

The best evidence that California lands are reasonable in price is the eagerness with which they are purchased when thrown on the market. If the population of California was stationary, if no newcomers were arriving to fill its lands, and if farm land did not always command such a ready market that the average owner is afraid to put a price upon his home, then there might be some excuse for thinking that our values were excessive, or at least on such a basis that there remained but little profit in farming them. When it is noted, however, that our population increased over 60 per cent during the decennial census period, 1900 to 1910, it will be seen that there is a very active demand for California land.

Subdivision H: California Laws:—The laws of California are most favorable for the investor in farm mortgages. Loans are generally secured by deed of trust, providing that in the event of failure to pay the interest, taxes, or other items, the loan can be foreclosed inside of thirty days, the procedure being to merely insert an advertisement in the paper and at the appointed time to offer the property for sale to the highest bidder. No court action is necessary and the borrower has no right of redemption: absolute settlement of the whole matter is had inside of thirty days, without trouble or inconvenience.

This makes for prompt interest payments, as the farmers realize that unless they are prompt they will have to make way for those who can pay the interest when it is due.

There are no homestead exemptions such as exist in other states and the ordinary exemptions from debt are reasonable and do not apply to land which is held as security for a loan. The holder of a mortgage after exhausting the security of the land may proceed against the farmer's live stock and other personal property until his debt is fully satisfied and discharged.

All things considered, it will be admitted by any person who has investigated the subject, that California is the ideal loan field. It is not necessary for the prospective investor to take the opinion of an individual upon this subject, even though the individual may have had considerable experience and may be familiar with most of the loan fields of the country. The opinion is borne out by the successes of the large life insurance companies which are operating in this territory, the experience of these companies having been uniformly successful and almost altogether free from foreclosures and loss. It is safe to say that during the past twenty years no investment has shown such a record for freedom from loss and for stability as the farm mortgage upon improved farm land, and the farm mortgage investor who entrusts his funds to California, may feel that he has done the wise and sensible thing.

If ordinary business-like precautions are taken in selecting the agent through whom he deals, the investor in California farm mortgages should experience the greatest satisfaction with his investments, and he may also feel assured that his participation in the development of a great state will be gratefully welcomed.

SAFE and sane investment is the secret of fortune building. It is more certain than any other method of legitimate finance. California is the ideal loan field. The farm mortgage investor who entrusts his funds to California may feel he has done the wise and the sensible thing. Here success is the rule and failure the exception that proves it. Prospective investors are invited to write the Service Department of CALIFORNIA'S MAGAZINE for information as to farm loans in this State.

Panama-Pacific International Exposition— "University of the World"

By Hon. Thomas R. Marshall

Vice President of the United States of America

THE stages of my life seem to have been marked by national expositions. My young manhood began with the Centennial. Maturity was marked by the Columbian and the Louisiana Purchase. And now the sunset years bring me to this marvel of the republic upon the shores of the sunset seas.

So often have I thought I saw the Pillars of Hercules inscribed with their "ne plus ultra," that I hesitate to say that I have reached them. But they who builded this Panama-Pacific exposition were so wise in adopting all the good features and avoiding those which marred the preceding ones that to me it seems as near perfection as the mind and hand of man have ever wrought.

Whoever can, even at a sacrifice of something which for the moment appears necessary, should come to see a real work of art never equaled even by a mirage.

If there be any one in America with a thirst for knowledge and for beauty and a longing for a liberal education such an one can here obtain it.

This is the university of the world. It has a chair fully endowed to meet the wants and needs of each. The eye, the ear, the mind, the heart, the soul each may have its horizon here enlarged.

I came to bear a message. I remained to become a student. I leave the feet of this Gamaliel of all expositions with regret.

California is a State of mystery, of seeming madness and method, a State replete with art, science, literature, law, order, and material prosperity, of marvelous accomplishment. What others took to be the mutterings of a mighty man in sleep she has made the all-compelling language of her people. This exposition has to be to justify in the mind of man the potency of dreams and visions over mere material things. It is in consonance with the record of this people. Some time in the hurrying rush of restless men it had to be, but it came sooner than it otherwise would have come because some one dreamed that here in this sun-kissed clime there lay the seven cities of Cibola.

Surely he should not be charged with being merely poetic in mind who on this occasion boldly declares that California is the product of a dream and that this exposition is the composite photograph of dreamers.

A Splendid Use *for* Cannon

By Hon. John Barrett

Director General Pan-American Union

WHEREVER I go I find the business men of today have sentiment in their hearts and they want to so do and so live that, when they are through with the day's work, they shall have the honest feeling that they have done something for the good of their city, and the good of their section, and the good of their country. So I appeal to you to look beyond the material side and think of the sentimental side of this great question. Remember we are all in the same family of nations in this great Western hemisphere and should each have the kindest feelings toward the other. Let us remember that each one of these twenty countries (Latin-American) is independent of Europe—and how? By the leadership and example of the patriots who were inspired to make the fight for liberty—by the example of our own immortal George Washington. And now, if we want to have our flag loved and cherished upon the banks of the Amazon and on the plateau of the Andes as we would have it in the Valley of the Sacramento, and upon the plateau of the Sierra Nevada and Madre, let us bear this thought in mind—this contrast of civilization in mind: Across the Atlantic Ocean the greatest nations of the world are engaged in destroying the greatest monuments and buildings that stand for peace and good will and happiness among men. That is Europe today—that is one picture. Now here is the other: Journey with me as Pan-Americans down through the Sierra Nevada and Madre to Mexico; down along the Andes until we come to the boundary line between Chile and Argentine. Stand with me there—15,000 feet above the sea, looking down over the stretches of Chile, towards the Pacific on the one hand, and upon the other, on the Pampas of Argentine. Those two great countries are amply typical of the lands of America—and there I will show you, standing in magnificent solitude and in mighty power, grandeur, and loveliness, the statue of Christ, the Saviour, *made of the melted cannon* of Argentine and Chile when, twenty-five years ago, with greater cause for war than had these countries of Europe, they decided in the interest of civilization and of progress to settle their dispute by arbitration. There they built this statue and upon its base are inscribed these immortal words: "Sooner shall these mountains crumble to dust than shall Argentine and Chile go to war."—*From address at Commercial Club luncheon in San Francisco, January 8, 1915.*



California's marine gateway to the world—"The Golden Gate"

A Forecast *for* California and the True Significance *of* the Panama Canal

By Dr. Benjamin Ide Wheeler

President of the University of California

Editor's Note: Coupled with his force as a writer Doctor Wheeler possesses a knowledge of his subject that is broad and comprehensive, reaching at times an almost prophetic vision in the contemplation of the future development of California as a result of certain epoch-marking events of which the completion of the Panama Canal is, of course, the culmination. Also the great possibilities of rural California for the settler have been indicated by Doctor Wheeler, with particular stress upon the great amount of room the State offers for a largely increased population. Present European conditions naturally render an article of this character difficult, and Doctor Wheeler has met the difficulty admirably.

EVERY ONE who has looked out upon the Pacific from the beaches and bluffs of California must have felt it a lonesome ocean. And California, with its vast plains and scant population often seems a lonesome land. Though evidently created for the special use of humans it has had to wait long for humans to come and find it. It lies far off under the sunset, a blessed island, pent up between 1200 miles of mountains and desert on the one side and 5000 miles of barren sea on the other.

The narrow Pacific Coast strip of North America which California's position represents has been hitherto about the most isolated part of the usable world. Chile was much more accessible to ships from Europe. Ships which continued their voyage to San Francisco had not only to cover seventy degrees of latitude, but must traverse westward the equivalent of the width of the United States; for Valparaiso

is in the longitude of New York, not that of San Francisco.

Practical proof that California's isolation, for whatever reasons, was actual, is found in the fact that the white man was so slow in finding it despite its charms. Two hundred years after the settlement of Boston it was still a mythical land, and as late as 1845 its population included less than 700 "Americans."

Though it burst into a population of a quarter million with the goldseekers' rush of 1849 and 1850, its isolation reasserted itself in the following years with a steadily diminishing rate of increase in population—54 per cent, 1870-80; 40 per cent, 1880-90; 22 per cent 1890-1900. In 1900 it had less than a million and a half, only nine to the square mile. (The density of population in California today is fifteen.) Prior to the awakening

which came to California in the year 1898, its people bore the evident marks of settling down into distinct ways and interests of their own. California was acquiring a character, and a very interesting one, which God grant it may never quite lose—but it was acquiring it at the cost of becoming provincial. It had entered the Union in 1850, but forthwith proceeded with unerring footsteps to march straight out into a social union of its own and with itself. It could not help it—it was an area so vast, and its life was so separate, and so separately conditioned by sun and soil, by the tasks of the day, and by the temper and minds of men.

But be this as it may, California and California life in the last decades of the century were evidently settling down into a certain half stagnation. The first impulses had spent their force; new activities did not develop; new resources did not for the moment appear; fuel oil and water power, which during the last few years have had much to do with awakening the industries, had not then come into play; wheat raising still dominated agriculture, with declining product; irrigation, which has turned miles of desert into garden, was yet only in crude beginnings. A torpor lay upon the land. It might almost seem that life was slowly reverting to the "lotus-land society" of the dreamy old Spanish days. But with the close of the decade there came a sudden awakening.

THE AWAKENING

Foremost among the causes was the opening of relations with the Philippines. The quickening of life in the Pacific called attention to a new factor involved in the position of the State. California had begun with the gold quest in the mountains; then it descended into the plain for agriculture and fruit raising; last of all it discovered the ocean spreading before its doors. But the last shall be first.

All through the ages of man on the globe the Pacific had been a waste and neglected area. In our geographies the globe maps always begin and end with it; the Pacific is as good as never in the middle of the map. It is so with the days; they end somewhere

in the Pacific, and then begin all over again before they land in Asia.

"THE ROOF OF THE WORLD"

The Old World was occupied by civilized man, stretched westward across Asia and Europe to the shores of the Atlantic. Sharp athwart it, north and south, ran a frontier which divided the historic life of man in twain. It follows the Indus, or the western boundary of India, and passes over the "roof of the world," the Hindu Kush Mountains and the Pamir highlands, into Turkestan. This frontier, which sharply sunders the social history of man on the globe and makes of one world two world halves, was the result of Alexander's conquests. Those conquests united the fundamental materials of the Western world, but neglected the Eastern world. When he halted his victorious march at the Hyphasis, and turned back to the West, he left the East of India and China to go their own way, and the materials of their thought and habits never came through the hopper into the world grist. If he had pushed on, there might have been no East nor West. As it is, the historic life of that West to which we belong combines materials representing all the lands and peoples from Persia to Ireland; but when we study history we pay no heed to India or China, though they are half the world in numbers, and mightily more than half in human experience.

So the Old East and the Old West stood all the long years back to back at the "roof of the world," and it was not until the West had pushed on westward half way around the world, and, after tramping the Western continent, had thoroughly wetted its feet in the waters of the Pacific, that it came to stand face to face with the East. Columbus was the forerunner, for he sought India, not America. The heart of men had always yearned unto the East and its riches. There was nothing new in Columbus' search. All that was new was the direction. Columbus went west. Judged in terms of its original purpose his voyage was a total failure. He started straight for Asia, but ran upon the long, broad dyke of land we now call the Americas. It has cost

more than four centuries for him and those who swarmed after him to traverse and conquer the hindering dyke which rose in his path and forbade him Asia. The opening of the Panama Canal is the first cutting of the dyke, the avenging of Columbus, the end of the four-century half, the resumption of the advance toward the Orient.

The first settlers along the Atlantic Coast, however, were seeking, not India, but fortune and refuge in an annex of Europe. Their faces remained set toward Europe, and even when they occupied the interior, they backed into the country, eyes to the East. Even when they reached the farther coast, it was still the contents of the land, not the meaning of the sea, which interested them. America still looked eastward; California was the farthest hinterland. With the year 1898 there suddenly awoke in the minds of the people the consciousness of the Western sea and its meaning for the nation. Under the old arrangement of the world the Occident sought the Orient by going eastward, first by the old caravan routes, then by the Persian Gulf or the Red Sea, then by the route around the Cape of Good Hope, then by the Suez Canal. America was an annex of Europe bordering on the Atlantic, and California was its farthest back country. Under a new arrangement, for which the events of 1898 and 1914 bear typical significance, the two world halves, long back to back at the frontier of India, are face to face on the Pacific.

There is no doubt that it is the ocean which awakened California and that 1898 is the year of the awakening. California as things were before 1898, stood at the end of a *cul de sac*, a fine, decorative end—but the road went no further. People came out from the East, few, very few, and mostly in winter; swung around the circle, and mostly went back. Today, San Francisco is a station on a main highway around the globe. The East and Far West are blending just now with astonishing rapidity. The large proportion of fresh blood brought in from the East in the last sixteen years is making itself most potently felt in

every activity. The new population consists largely of home makers.

This California which is just bursting forth into a new life is richer in resources and opportunities than any gold seekers ever dreamed. Despite all the great stories that have been told of its riches and its charms, great stories that have given so many Californians in the outer world the repute of braggarts and florid deceivers, really the half has never been told. California is really still an undiscovered land for most of the world, as it certainly is an unoccupied land. Otherwise the fairest land provided for the residence of men would have more than fifteen residents to the square mile, and farms of ten thousand acres, any ten of which would support a thrifty family, would not be so common as they are. The average acreage of a California farm is 318 against an average in the nation at large of 137, and the consideration of higher fertility and adaptability of climate emphasizes this discrepancy.

It must be doubted whether many Americans, even, to say nothing of the rest of the world, realize how vast a domain passes under this single familiar name, California. The ten states, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, and Ohio, could be set down within its borders, and if it were transferred to the same latitude on the Atlantic Coast and laid down there, it would stretch about from Boston to Charleston, South Carolina. The State population on January 1, 1914, was 3,155,656. The area is 158,297 square miles. Japan, coupled with Formosa, is considerably smaller than California, but it supports a population far beyond 50,000,000. Italy, with two-thirds the area of California, has about 35,000,000. Such discrepancies can not long maintain themselves in the face of modern transportation and distribution of intelligence. The opening of the Panama Canal creates entirely new conditions regarding immigration. Immigrants from Europe, who formerly had to add a long and uncomfortable transcontinental journey to their sea journey, will now be set down directly

upon the pier at San Francisco, and at a cost, including food, not more than \$8 greater than the fare to New York.

If we allow one-half of California's area for mountains and give the remainder a density equal to that of Rhode Island the population of the State would be 40,000,000. There is evidently some colossal leveling-up to be done. If ever there has been a danger of the Orientalizing of the Pacific Coast, twenty-five years of free influx from Europe will abate the peril, at least for the present.

At any rate, a proper labor supply will enormously quicken the industrial life of the State. It is needed for agriculture and fruit culture and, coupled with the oil supply, comparatively newly found, and the newly appreciated water power and its electrical transmission, it will set in motion the wheels of manufactures which have been thus far the State's sorest lack. Living is commonly reported to be dearer in California than in the East. This is not true, except for domestic service and for manufactured goods, which have mostly to be brought from the East. Food is distinctly cheaper than in the cities of the North Atlantic Coast. People live more freely, devote more attention and probably more money to the joy of life, but they choose to do it, when they have the means, as they most always some way seem to have, and in this sense living may be more expensive. The abundant life is more the manner of the land than the patient thrift of old New England. Grinding poverty is seldom in evidence. The masses of the people bear in their dress as well as in the skin of their faces, the marks of prosperity and well being. The per capita wealth of California is \$2800, as against \$1125 for the United States, \$751 for Germany, \$1145 for Great Britain, \$1228 for France.

The chief sources of this widespread, almost universal, prosperity are found in the mineral resources of the hills, but much more in the richness of the soil and the benignity of the climate, which admit of the production of every plant and fruit of the temperate zones, and in nearly every case to a somewhat greater advantage than anywhere else.

And yet the yield of the land is only a beginning of what it will be when a dense population with more hands and the application of more immediate personal interest constrains to intensive farming under the guidance of scientific methods.

HOW THE CANAL WILL MAKE ITSELF FELT

It is evident that the canal will have—must have—with the process of the years, an overwhelming influence in readjusting the conditions of human life upon the globe. There are four connections in which the canal opening will be immediately felt:

1. The Eastern and Western coasts of the United States will be drawn closer together. They have been wide apart. Their interests have been different. They do not understand each other. Closer relations will, however, show how admirably they supplement each other. The West yields the raw materials of industry and foodstuffs. The East is industrial. Interchange with the development of interdependence will make their very differences a source of union.

2. The West Coast of North America will be made accessible to the world.

3. The states and peoples of South America are to be drawn decisively nearer to us.

4. Japan and our Pacific Coast are drawn more closely together into a common area of trade and intercourse. Each will have to know what is going on with the other. We must make up our minds to settle down and live in the same world, if not in the same country, with the Japanese. We can not ignore them; they are in our world, and very much in it. We have no hope in violence. Wars settle nothing—not even who is strongest.

When all the means of wealth in California shall be developed, the State can promise to maintain a population of 20,000,000 souls in an abundance equal to that which blesses its people today.

That this is no vague dream may be inferred from one single instance of fact. Professor Samuel Fortier, of the United States Department of Agriculture, states that there are about 1,375,000 acres of rich valley land now "under ditch," *i. e.*, ready for irrigation,

but which are not irrigated on account of lack of settlers. These acres alone would furnish home and support for 60,000 farmers' families.

The old idea that the California valleys were a desert in summer gave over to the slender earning power of winter wheat vast tracts of land which now, under the magic of an irrigation which makes the rains descend at will, can be divided into gardens and orchards where one acre is as good as five were once.

The profitable industry of lemon and orange raising seems capable of being extended far beyond the southern area to which until recently it was supposed perforce to be limited. It is creeping steadily now along the foothills which invest the great central valleys, where it finds freedom from killing frosts and a much earlier ripening period. A thriving orange orchard frequently earns a net income on a capitalized value of \$5000 or \$6000 per acre. A good orange tree is likely to earn \$5 net per year, besides being good to look at all the time.

And then there are the rich products of dried fruits, canned fruits, asparagus, wine, dairying, cereals, hay, vegetables, hops, beet sugar, cotton, timber, olive oil, olives, fish, cement, petroleum, minerals, and so on.

One of the chiefest resources of California is its climate. Not only does it have a fundamental value for crops and plants and fruits as to their variety, quality, quantity, and ease of production, but it is supremely good for animals—both live stock and the human animals. The human animal revels and flourishes in it. It makes the great outdoors available all the time in luscious abundance to ordinary men. It cancels the perpetual struggle of life against weather. It is an economic factor and cancels the waste time spent in shivering and wiping perspiration. It gives the opportunity of full days and full years of effective living. Old age will be prolonged five years or more by coming here, through the lessening of strain and the avoidance of crises, and it will be prolonged in the higher enjoyment of life. Youth will grow up into fresher health and strength through the inevitable practice

of outdoor life. There are many kinds of climate within the State, mountain air and seashore air. Every valley has its own peculiar blend, but all contain the standard ingredients of sunshine and air, and all are good.

NATION'S PLAYGROUND

It is a good place to work in, but it is also the natural playground of the nation. Its mountain streams are the fisherman's delight; game abounds and ducks from everywhere assemble in the marshes at the appointed season to be shot; golf and tennis have open season all the year; there are no finer seashore resorts in any land than Del Monte, Santa Barbara, Coronado, and the beaches of Los Angeles, and nothing finer in any mountains than Lake Tahoe; the Yosemite Valley is the most gracefully charming of the great wonders of the land, and mountain climbing in the high Sierras is a high and unique sport with rules and regulations all its own. In all there is amazing elbow room, but in the Sierras most of all. California of all the places in the world was evidently made especially for human beings to live in, but strange enough, they found it last of all.

As the land was made for men, it constitutes no wonder that the people who dwell in it, unerringly as unconsciously, turn with their chief interests toward humanism. Their instinctive fondness for music, the drama, color, and all beauty, as well as their preference for literature, philosophy, art, and history among the higher pursuits, testifies to the bent which the land has given them. All their doings, in society and politics, in clash and concord, abound in freedom of the spirit, sparkle and snap with the human and the personal.

Their peculiar zeal in building schools and universities speaks for their desire to make their children free, and to give the human which is in them freest and fullest scope.

The society which they are building from the resources of the fairest land of the West, with human materials gathered from all the bloods and experiences of Europe, is set at the forefront of the Occident to face the awakening East in this final meeting of the world halves. This is the mission of California.

The Psychological Hour for Logical Commerce

By John Hays Hammond

of California; America's Most Eminent Mining Engineer

EDITOR'S NOTE: Mr. John Hays Hammond is a native Californian, San Francisco being his birthplace. He is a graduate of Sheffield Scientific School (Yale) Ph. B. 1876, A. M., 1898; also Royal School of Mines, Frieberg, Saxony, 1880. In that year he was special expert to the United States Geological Survey, examining California's gold mines. He has been a consulting engineer for many large concerns. Mr. Hammond was president of the American Institute of Mining Engineers, 1907-8, represented the United States at the coronation of King George of England, June 24, 1911, and as a member of the California State Mining Bureau in the latter eighties contributed valuable papers to the reports.

WHILE Europe is at war destroying, America, at peace, should be constructing as she has never done before. For me to say that this especially is our opportunity to expand our foreign commerce sounds trite, but the oftener it is said the better. Here, however, we must go beneath the surface and consider of just what the opportunity consists. . . . It will demand a great constructive programme first, and after that the energy, the common sense, and above all, the persistence necessary to its execution. . . . Eventually we shall become the dominating factor in the world's export trade. Therefore, why not now? . . . That market which is most logically ours, one which we have most neglected, lies to southward of us, and it is more than ever logically ours now that we have completed the Panama Canal. . . . Now, undoubtedly, the psychological hour has struck in which the leaders of American commerce must act. . . . If we definitely intend to go into South America after trade, we must do much constructive work there, helping to finance South American enterprises and even South American governments. . . . Co-operation from South America is an essential, and I believe the time has come when this may be obtained if a plan is suggested which gives any reasonable promise of effectiveness. I believe such a plan may wisely include the creation of what we may designate, for the time being, a Pan-American supreme court, the specific purpose of this tribunal being to investigate and decide disputes as to foreign investments in Latin-American states. . . . It is my belief that each interested nation should be represented in the membership of the court, while the chief justice should be chosen by a vote of all the members. . . .—*Excerpts from interview in New York Times.*

The Panama Canal and What It Has Demonstrated Since Opened to Traffic

By Hon. Joseph R. Knowland

Member of Congress from California 1904-1915 and Member of House Committee on Interstate and Foreign Relations

Editor's Note: Few men in this country have had a more intimate connection with the legislative features of the Panama Canal matter than Honorable Joseph R. Knowland. He, by reason of his capacity, was personally in touch with many measures of importance in the matter of tolls, etc. Congressman Knowland is a resident of Alameda County and prominent in state and national politics. Matters of commerce, interstate and foreign, have engrossed his attention to a large extent, and he is a recognized authority upon the subject. His article gives succinctly some of the history of the canal in its passage through the congressional halls.

DURING the four centuries that the world has been considering the construction of an isthmian canal to unite the two great oceans, the effect of such a waterway upon the commerce of the world has been an interesting topic of discussion.

Since August 15, 1914, the date of the informal opening, the question of the influence of the Panama Canal upon domestic commerce has been largely removed from the realm of speculation. Due to the European war the movement of ships of foreign register through the canal has necessarily fallen far below estimates, upsetting all calculations.

The coastwise traffic is greatly exceeding the estimates made by Professor Emory R. Johnson, special commissioner on Panama Canal traffic and tolls. Up to February 1, 1915, this traffic, covering a period of five and a half months, has totaled 916,158 net register tons. The same average would bring the total coastwise business for the first year to over

2,000,890 net register tons. Doctor Johnson estimated but 1,160,000 tons. The actual coastwise tonnage is exceeding by 72½ per cent the estimate. The foreign traffic for the five and a half months has aggregated only 1,276,698 net register tons, and with this as a basis would total for the year 2,785,522 tons, 6,554,478 tons below the government expert's figures. In other words, as a result of the war, foreign traffic is falling 234 per cent below the most conservative estimates. The Royal Mail, Hamburg-American, North German Lloyd, and various French lines, had arranged to utilize the canal.

When the war is over no doubt the estimates in foreign business will be exceeded as they have in coastwise, which will mean that the foreign revenues alone will pay more than double the cost of operation and maintenance.

During my eleven years' service in Congress all the most important canal legislation has been enacted. As a member of the House

committee on interstate and foreign commerce, which committee exercises jurisdiction over general canal legislation, it has been my privilege to take an active part in framing the various acts.

It was not until 1906 that Congress finally determined upon the lock type of canal. In 1912 legislation was reported from the committee on interstate and foreign commerce providing for the opening, maintenance, protection and operation of the canal. This legislation involved many intricate problems, not the least important being our rights under the various treaties, and the question of the effect of toll rates upon prospective foreign and domestic commerce.

An exhaustive and painstaking study of the numerous treaties convinced me that the United States clearly had the right to exempt American coastwise ships from the payment of tolls. I submitted the minority report from the committee advocating exemption and was sustained in my views by Congress and the President. Two years later a bill was reported repealing the free toll provision. I again submitted minority views, but the legislation was carried through Congress. With many others I felt that if repeal was forced through that it should be accompanied, and I so declared on the floor of the House, by some declaration, unequivocal and unmistakable as to its meaning, that would make it clear that we did not accept the foreign powers' interpretation of the treaty which would clearly mean the sacrifice of important and vital American rights affecting this nation, commercially, politically, and strategically, now and for all future time.

The Senate inserted an amendment which is a part of the repeal act and reads as follows:

"Provided, that the passage of this act shall not be construed or held as a waiver or relinquishment of any right the United States may have under the treaty with Great Britain *to discriminate in favor of its vessels* by exempting the vessels of the United States or its citizens from the payment of tolls for passage through said canal, or as in any way waiving, impairing, or affecting any right of

the United States under said treaties, or otherwise, with respect to the sovereignty over or the ownership, control, management of said canal and the regulation of the conditions or charges of traffic through the same."

This leaves the entire question open for future consideration, but repeal unquestionably and necessarily weakened the case of the United States, the Senate proviso notwithstanding.

Convinced, as I have already stated, that the United States had the absolute right to exempt American coastwise ships, I advocated this policy upon the theory that it would result in a direct benefit to the shipper and consumer of the United States. I felt that the American people, having constructed this waterway unaided, at an expenditure of nearly \$400,000,000, were entitled to the fullest benefits.

I have always frankly admitted that even with a toll of \$1.20 per net register ton upon coastwise traffic that all Atlantic and Pacific ports could ship through the canal in competition with the transcontinental railroads, and at reduced rates, particularly if we barred, as the canal act does, transcontinental railroad-owned and controlled steamships, and further provided, which Congress likewise did, that no coastwise ship, trust-owned or controlled, or which entered into rate fixing agreements, could have access to the waterway.

My contention was, as a reference to the minority reports and to my speeches upon the floor of the House will disclose, that the lower the toll the greater competitor the canal would become of the transcontinental railroads, and, what was of even greater importance, the farther inland would reduced rates be reflected, and the wider the markets opened up to the products of California and other states.

In the minority report which I submitted to the House of Representatives on the canal bill on March 20, 1912, I said among other things:

"Any reduction in rail freight rates forced by sea competition between, say New York and San Francisco, is contemporaneously applied between Chicago, St. Paul, St. Louis, Kansas City, and, in fact, every city of the Middle

West on the one hand and every Pacific Coast city or town on the other. This always has been so—it always will be so.”

Continuing in the advocacy of this policy, calling for the fullest utilization of the canal, I declared:

“It can not but minimize rail freight rates on all the manufactures of the Atlantic seaboard and the Middle West, the products of the great Mississippi Valley and those of the Pacific Coast, to the ultimate advantage of the producer and consumer throughout the entire country.”

On January 29 of this year the Interstate Commerce Commission rendered a most important and far-reaching decision bearing directly upon the broad question of the value of the canal as a regulator of freight rates, and sustaining the argument that any reduction in freight rates forced by sea competition between Atlantic and Pacific ports would be applied between other points. The application before the commission was for relief from the provisions of the fourth section of the interstate commerce act, known as the long and short haul provision, from the operation of which section the commission has authority to relieve carriers.

The railroads desired to meet, at least in part, the competition of the canal. The record shows that the application was supported—and this is most significant—by shipping interests in Chicago, Duluth, Minneapolis, St. Paul, St. Louis and the Missouri River cities upon the ground, and I quote from the commission:

“That if further relief be not afforded to the carriers upon this traffic, the *present policy of the carriers of maintaining rates from intermediate territory to the Pacific Coast no higher than from the Atlantic seaboard* will be defeated.”

These localities all feared the effect of the canal. It has already brought them reduced rates, for the commission authorized the trans-continental railroads to reduce certain rates between Atlantic and Pacific Coast terminals, which rates might be lower than to intermediate points. Reductions were also author-

ized, lower than to intermediate points, from the Missouri River territory to Pacific terminals.

The Interstate Commerce Commission in its decision made some general observations concerning the influence of the canal on freight rates of great interest to the people of the Pacific Coast.

“Since the opening of the Panama Canal,” states the commission, “the water carriers have materially reduced their rates, shortened the time of transportation, increased the frequency of sailings, added to their tonnage capacity, and greatly added to the tonnage secured of this coast to coast freight.”

Here is another most significant passage:

“We are witnessing the beginning of a new era in transportation between the Atlantic and Pacific coasts. To secure any considerable percentage of this coast-to-coast traffic rates on many commodities must be established by the rail lines materially lower than those now existing.”

That the commission is desirous of extending to all the people the benefits of reduced rates is evidenced from the following passage:

“In so far as any reasonable and lawful reduction of rates will permit, the benefits of this increased service should be extended to all of the people.”

“It may be said also,” declares the commission, possibly in the way of a suggestion or proffer of advice to the railroads, “that a policy of greater liberality on the part of the rail carrier to these interior towns will result in benefit to themselves.”

Over fifty ships are in regular service between Atlantic, Gulf, and Pacific coasts. There are half a dozen lines, with more in prospect, the largest operating twenty-six ships with sailings every five days, and the smallest at least two ships, with thirty-day sailings.

In this connection it may be well to recall that when the legislation was pending prohibiting railroad-owned ships from operating through the canal in competition with their rail lines, it was freely predicted in committee and on the floor of Congress by the railroad interests opposed to this legislation that such

an inhibition would mean that few if any other ships would be built, purchased or leased for the service.

It was generally believed that sailing vessels would not use the new route. Up to the first of the year four sailing vessels have passed through the waterway. One of the vessels was an old prison ship on its way to the San Francisco exposition, and another a pleasure yacht. The two remaining vessels carried freight. It will be interesting to learn if the experiment proves profitable.

The second minority report which I presented to Congress upon this subject, submitted on March 14, 1914, in opposition to repeal and in favor of maintaining our historic policy of free commercial intercourse between the states, contained these words:

"Nor are reductions in rail rates the only advantage which the people from the great interior of our country are to reap. Much of the commerce of the great Mississippi Valley will flow down the rivers which drain it to the Gulf and thence through the canal to the Pacific Coast. Likewise Pacific Coast products will to a large extent eventually be distributed through the Middle West via her waterways. Every burden placed upon traffic through the canal impairs its usefulness as a competitive route."

Under a free toll policy a greater volume of canal traffic would unquestionably have moved to and from interior points. I have made careful inquiry from official and other sources to ascertain the extent of interior shipments since the canal opened. The Interstate Commerce Commission directs attention to movements of cast iron pipe from Birmingham, Ala., by rail to New Orleans and then through the canal to the Pacific Coast; also structural iron originating at various points in Pennsylvania. Wheeling, W. Va., and a number of Ohio points have utilized the waterway. There have also been instances of small quantities of freight being carried between Chicago, St. Louis, Kansas City, Detroit and St. Paul through the canal to the Pacific Coast.

It is interesting to note the character of freight carried. In the December monthly

summary of foreign commerce issued by the Department of Commerce a partial list is given of the domestic merchandise shipped through the canal in the coastwise trade. Between the Atlantic and Gulf ports to the Pacific Coast we find the largest shipments to be of iron and steel manufactures. Cotton goods were well up on the list. Boots and shoes are being shipped in large quantities. Among other articles are printing paper, tinware and tobacco. From the Pacific to the Atlantic and Gulf we find in the lead canned salmon, fruits (mostly dried), nuts, hops, beans, wines, lumber and wool.

Except as to foreign business, the Panama Canal is meeting expectations regardless of general business depression. With the war settled there is every reason to predict that the estimates touching foreign traffic will be exceeded. This great artificial waterway, the most stupendous enterprise of the age, is cheapening freight rates. Already the railroads are taking notice. I do not believe these land carriers are going to seriously suffer. I hope not. There will be an adjustment of rates. Certain commodities will move by water and others by rail. There will be a larger volume of freight moving because of cheap water rates, resulting in a large share of the new business going to the railroads through back hauls.

After all, however, does not the military importance of the canal overshadow all commercial considerations? This has always been the view of Colonel Goethals. It is a satisfaction to Pacific Coast residents to know that the Atlantic fleet is now available in case of emergency.

To those of us who fought successfully for the fortification of the Panama Canal, events growing out of the European war have furnished ample vindication. We were urged to neutralize the waterway—to erect no fortifications! Belgium was neutral. We have heard much of the freedom of the seas. There is no freedom apparently while war exists. But the canal is fortified, and this knowledge is more reassuring to the American people today than ever before.

California's Possibilities *for* Pan-American Commerce

By Hon. John Barrett

Director General Pan-American Union

Editor's Note: Though a New Englander by birth and education, Honorable John Barrett when he started West, as he expresses it, "did not stop" until he arrived at the Golden Gate. He taught school in this State, became a newspaper man, and finally entered the diplomatic service as minister to various countries and later became director general of the Pan-American Union. Mr. Barrett is an enthusiast as to Latin-American possibilities for increasing trade with this country, and in his article he has pointed out briefly but forcefully just what we must do to develop that commerce. A fluent speaker and graceful writer, Mr. Barrett is daily arousing in others the enthusiasm that actuates his own purpose.

FEBRUARY 20, 1915, marked the beginning of a new era in the history of California. It was the birthday of San Francisco's coming of age as a world city. Above all things, it signaled her prominence and emphasized her possibilities as a great Pan-American center of commercial activity and international influence.

The people of California want to achieve some great tangible result from the Panama-Pacific International Exposition. Speaking from my standpoint, as the executive officer of the Pan-American Union, the official organization devoted to the development of commerce, friendship and peace among the twenty-one American republics—the United States and her twenty sister nations—and hence from the unique position of being the only international officer in America, let me urge that the expo-

sition be made the actual celebration of the newly created possibilities for the development of Pan-American and Pacific commerce which must follow the opening of the Panama Canal.

Let San Francisco be inspired by the exposition to take action in the form of both individual and organized movement by its own citizens and in co-operation with those of other coast cities, to extend its present worthy efforts and inaugurate new plans to build up its exchange of products, raw and manufactured, with the twenty countries of Latin America, all of which are either directly or indirectly dependent upon the Panama Canal or tributary to the trade of the Pacific Ocean.

I can not therefore urge too strongly that now is a most propitious time to get into the closest touch with all Latin America. A new spirit and conception of Pan-Americanism is

THE work (the Panama Canal) stands as a triumph of American accomplishment; builded into it are American imagination, American creative genius, American brains, courage, perseverance, and a tithe of the vast resources of our people; a work not for ourselves alone, but for all the people of all the climes "who go down to the sea in ships and do business in great waters."—*Isham Randolph, C. E., D. E., in "The Economist."*

abroad from Canada south to Chile. Pan-American solidarity of interest is being splendidly emphasized and strengthened by the European war. Pan-American inter-dependence in both trade and diplomacy is being proved beyond a question by the struggle of the European nations. Possibly the silver lining to the dark war cloud is the spontaneous present evolution of the Monroe Doctrine into a Pan-American policy—into a new relationship where the Monroe Doctrine belongs as much to Argentina, Brazil and Chile, as it does to the United States.

Possibly still more, let us hope that Pan-American co-operation as exemplified in the present practical action of the Pan-American Union for the protection of the interests of the neutral American nations may yet develop into a powerful and well meaning influence to bring peace to Europe through the impartial mediation of the united nations of the Western Hemisphere.

Just as Pan-American mediation saved the United States from war with Mexico, it may yet, in the form of the mediation of the United States, backed by the unbroken alignment of its sister American nations be able to prepare the way for peace in Europe and the restoration, therefore, of peace everywhere on earth and good will to men in every clime.

CALIFORNIA SHOULD LEAD IN PAN-AMERICANISM

Pan-Americanism is the slogan of the hour and California must become a mighty factor in building up the two great essentials of lasting Pan-Americanism—namely, reciprocal commerce and mutual confidence.

Studying the practical side, let me congratulate California on what it has already done and is doing, both in individual and organized or united effort, to build up its Pan-American commerce and relationship. Let me urge further practical effort along the following lines:

First, the acquiring of thorough knowledge of the field in the form of data that can be obtained from the reports and publications of the Pan-American Union, and the Bureau of Foreign and Domestic Commerce in Washington;

Second, the extension of the work and responsibility of the foreign trade sections of the chambers of commerce of the state;

Third, the sending to Latin America of qualified representatives either by individual firms or by firms acting together;

Fourth, the utilization of the opportunities and facilities afforded by reasonable commission houses and manufacturers' agents;

Fifth, advertising in the Spanish and Portuguese languages, instead of English, in papers and magazines sent to or published in Latin America, and the distribution of catalogues prepared in accurate and idiomatic Spanish and Portuguese;

Sixth, the manufacture or preparation of just what the Latin-American market wants and then the proper packing thereof for the peculiar conditions of transportation and climate;

Seventh, the organization and development of banking, credit and exchange relations and facilities suited to the peculiar demands of Latin-American commerce, including the establishment of branch banks on the west

coast of Mexico, Central and South America, controlled by California capital;

Eighth, the possible organization of a large trading company with ample capital for the purpose not only of building up its own trade but helping the small coast manufacturer, exporter, and importer to enter the field;

Ninth, the development of import as well as export trade, to provide return cargoes for vessels and bring raw products for new industrial plants which will employ California labor and capital in converting such raw products into salable articles;

Tenth, the extension of first-class freight, passenger, and mail steamship service under the United States flag between California ports and the principal ports of Latin America;

Eleventh, the study of the Spanish language and the geography, resources, commerce, and history of Mexico, Central and South America in the practical courses of the universities, public and private educational institutions, and especially in the commercial courses of high schools, in order to properly prepare young men and women for the Pan-American field of trade and activity;

Twelfth, the making of the great cities of the State centers of attraction for the travel as well as the trade of the people of Latin America;

Thirteenth, the showing during both exhibitions of special hospitality to the visitors from Latin America, who I believe will come here

in large numbers this year because they can not go to Europe and because they want to see the greatest and most beautiful exhibitions which the world has ever known;

Fourteenth, the inauguration and fostering here of a general Pan-American movement in the knowledge and appreciation, on the part of our people, of the peoples and progress of Latin America which will awaken in return the responsive sympathy, knowledge and appreciation on the part of the Latin Americans, of the peoples and purposes of the United States.

LEADERSHIP OF THE UNITED STATES

In conclusion, let me give a few figures which will encourage the optimist and discourage the pessimist on Pan-American commerce: In 1913, according to the latest figures of the Pan-American Union, the twenty countries of Latin America conducted a foreign trade valued at the immense total of \$3,000,000,000, which represents an increase of nearly one hundred per cent in the last fifteen years. In this commerce, contrary to usual belief, the United States stands far ahead of Great Britain and Germany. In 1913, the figures for the United States, counting both exports and imports, the only true measure of trade, were approximately \$804,000,000; of Great Britain, \$640,000,000; of Germany, \$408,000,000. The actual exports alone of the United States were slightly ahead of Great Britain, being \$325,000,000 to Great Britain's \$322,000,000.

THE chief single fact about the canal is its aptitude for becoming a vital world asset, from the use of which under a far-seeing policy, our land and all lands will thrive. It should be no cause of contention, but a bond of fraternity and assured peace.—*John Bates Clark, Ph.D., LL.D., in "The Economist."*

The Western Hemisphere Coming Into Its Own

By the Late Hon. Duncan E. McKinlay

*Who as a Member of Congress from California Visited the Canal with the Interstate
Committee of the House. Formerly United States Surveyor
of Customs, San Francisco*

IT WOULD seem as if the Western hemisphere was at last coming into its own in dignity and progress, in its relation to the world. Certainly the tides of people of enterprise and of business have been steadily pressing westward since long before Bishop Berkeley declared that "Westward the course of empire takes its way," and that Western wave is rushing onward today more strongly and steadily than ever before in the world's history. Men of even middle age today will probably live to see the fulfillment of the dreams and prophecies of the olden time in the opening up of our coasts and land to ship commerce with every country on the globe.

In ancient days it was the fact that seas divided nations because of the difficulty of ocean travel. In those days the only safe routes were those over land, but in this modern time of gigantic ocean-going vessels, capable of carrying thousands of passengers and many thousands of tons of freight, water travel and transportation is the cheapest and most agreeable of all forms. And therefore, today it is a fact that the seas unite the countries of the world instead of dividing them.

The completion of the Panama Canal will be only the completion of one link in the chain of three great improvements that are in contemplation by the statesmen of America. . . .

The improvement of the Mississippi and its tributaries then, is one of the links of the chain. The Panama Canal is the central link. The third link must be and will be, . . . the re-establishment of the American merchant marine. . . .

I believe that it has been a well recognized policy of all the Presidents and statesmen of our country for the last twenty years to urge the accomplishment of these improvements. They come slowly, of course, but all large projects take time in their development, and those of us who today are so fortunate as to live in California, or anywhere on the Pacific Coast, may easily look forward to the time, not far distant, when California will be at least the second state of the American republic in wealth, and industrial and commercial power, and San Francisco the second city in importance under the American flag.

*This publication had secured from the late Honorable Duncan E. McKinlay the assurance that he would prepare a paper on the Panama Canal especially for this publication. But Providence decreed otherwise and Mr. McKinlay passed away ere accomplishing his purpose. The editor and publishers of this edition unite with the family and many friends of the late congressman in sorrow at his untimely demise. The above excerpt from a book by Mr. McKinlay seems particularly apropos. It reflects the breadth of view and patriotic spirit which characterized his public services.

The Shipping Industry of the Pacific Coast

By Capt. Robert Dollar

President Robert Dollar Company of San Francisco

Editor's Note: Captain Dollar, who is prominent not only in marine circles but in the public affairs of San Francisco, has prepared a very interesting statement showing the conditions under which ships are handled from this port. He discusses the three main divisions of our shipping—coastwise, intercoast via Panama, and foreign—and cites figures of traffic and conditions affecting it which should be widely known and considered. Captain Dollar looks forward to a time when the commerce of San Francisco will exceed that of New York of today. What is necessary to bring the maritime commerce between this Coast and other ports to its proper magnitude is suggested in his article.

THROUGH the foreign trade we anticipate a very great advancement and development of the shipping industry of the Pacific Coast. This will be brought about by the great increase of trade that we will get from the opening up and development of China. If it only keeps on increasing as in the past thirty-five years, when the Pacific Mail were the only company operating steamers, and their combined cargo capacity, of all their steamers at that time, was not as great as one of their large, modern, up-to-date steamers of today; if the increase keeps up in the same ratio, long before this century closes, the center of the world's commercial activity will be transferred from the Atlantic to the Pacific.

It has been generally supposed that the opening of the canal would take away a great deal of freight from our ports, but from the line of the great northern circle from Panama to Japan, San Diego is only 225 miles, Los Angeles 245, San Francisco 325, Eureka 430, Astoria 670, entrance to the Straits of Juan

de Fuca 800; so it will be seen that the deviation will be very slight.

The Pacific Coast is favored with many good and commodious harbors. Commencing in the extreme south is San Diego, having ample accommodations for all the requirements; next, Los Angeles with more than they require and by dredging they can extend indefinitely; then comes San Francisco with sufficient anchorage for all the navies of the world. Eureka has plenty of room for her rapidly growing trade. Then in Oregon is Coos Bay. As soon as contemplated improvements are completed, they will be able to berth the largest tramp steamers afloat. Then comes the Columbia River, when the jetties and dredging they contemplate are completed, they can receive vessels drawing thirty feet of water. Willapa and Grays Harbor are rapidly increasing their facilities to receive large vessels. At present steamers 400 feet long and drawing twenty feet have no trouble going in and out. Then Puget Sound, unsurpassed for its land locked bays, sufficient to take at one

time all the ships of the world. Seattle and Tacoma are rapidly building wharves to accommodate the great increase expected after the canal has been in operation. So from the foregoing, it will readily be seen that we have a combination of the best seaports in the world.

Our shipping may be divided into three parts, namely, first, coastwise; second, inter-coast via Panama, and third, foreign.

The bulk of the cargoes carried is from north to south; lumber furnishing more than 95 per cent of the whole. Those vessels carry north bulk cargoes, but not to exceed 10 per cent of their capacity. The steamers engaged in carrying lumber on this coast are constructed specially for this trade, and are entirely different than those seen in any other part of the world. The machinery is placed aft, and from 30 to 50 per cent of the cargo is carried on deck and with perfect safety to both the vessel and cargo. The ordinary height of these deckloads is from twelve to eighteen feet. To those interested in shipping who visit our exposition, this will be one of the most interesting sights.

Then the trade that will go from one seaboard of the United States to the other is problematical. The value of commodities carried in 1913 was \$80,026,517. This was an increase from 1900 of \$73,208,737, although handicapped by having to trans-ship by rail either via Tehuantepec or Panama, this was a good showing, but as to what the increase will be we must wait a year or two and see how the trade will develop, before we can even make any calculations. That the increase will be gradual, we are sure of, although some expect a boom all at once. In this they will be disappointed, but that there will be a tremendous expansion of this trade, admits no argument. The great difference between rail and all water rates will be sufficient to warrant this prediction, for with the opening of the canal the rate of freight has been reduced about 30 per cent.

Foreign trade has not been pushed as it should. The local or domestic demand has satisfied all producers, therefore there was

little incentive to go further afield as long as the home consumption kept up. Now we see that we must reach out for foreign markets. So far we have only exported the products of the forest, fields and fisheries, now we must reach out for manufactures. Up to the present time labor conditions have been such that effectually precluded the possibility of manufacturing on this coast for export. Now we feel that with the opening of the canal, a great number of emigrants will reach our shores. Employment must be found for them either in the cultivation of our fields or in manufacturing as very few will have money enough to take up land although there are millions of acres lying idle, waiting for people to cultivate it. We can expect factories to be built because raw material can be got as cheaply as in any part of the United States. Iron ore of a better quality can be laid down on these Pacific Coast ports at a lower price than the supply is delivered at Pittsburgh. Coking coal can be delivered here at a price that will produce coke at competitive prices if produced in the most modern by-product ovens, so there is no reason why we can not produce iron and steel, not only for our own requirements, but for export also. Then raw cotton and wool can be delivered at our seaboard as cheap as anywhere else, as both are grown near by.

The opening of markets of China alone warrants the prediction of an enormous commerce between that country and ours. Then there is the Philippine trade that has increased by leaps and bounds and a great trade will result. Japan, India, and the East Indies will all increase their trade with us. If we look at the custom house statistics they are extremely encouraging. In 1856 our total exports from this entire coast were \$3,460,448; in 1880, \$38,888,418; in 1914, \$112,146,011. So if this same ratio of increase continues for the next sixty years, it can easily be seen that the fulfillment of my prediction will be accomplished, that the Atlantic trade will be superseded by the Pacific, and that the commerce of San Francisco will exceed that of New York of today.

Looking East From the West

By Robert Newton Lynch

*Vice President and Manager San Francisco Chamber of Commerce and of the
California Development Board*

Editor's Note: The enlarged vision of the Westerner who regards the East in the light of commercial possibilities and the results of present day tendencies is comprehended by Mr. Lynch in his article. He sees the inevitable expansion, the drawing together of the centers of trade, the development of latent or under-developed resources, the certainty of increased manufactures, the potentialities of the extension of maritime commerce between the cities of California and the Orient as well as the Occident. Mr. Lynch is a keen observer and a student of commercial interests and relations. His article is edifying and instructive.

A REVOLUTION in the trade and industrial conditions of the Pacific Coast so profound as to defy accurate estimates of its extent or prophecy as to its future development has been created by the opening of the Panama Canal. The man who lives and works upon the Pacific Coast, turning his back upon the setting sun and facing eastward, finds spread before him a vast field of operation that had not before been apparent, for it was inaccessible in a degree rendering worse than useless any effort at successful competition with Eastern enterprise.

Heretofore the great pressure of Eastern business has forced the Western manufacturer and jobber to the very rim of the continent. The business area on this coast for the distribution of goods was of the smallest, while the Eastern jobbing houses or manufacturers' agents extended their operations to much of the territory rightfully belonging to Pacific Coast trade centers. Now all this is rapidly being changed and a new era in the develop-

ment of business upon the Pacific Coast is inaugurated.

It was generally conceded that the opening of the canal would affect the condition, but there was no little anxiety over the matter of tolls. When, however, the rates were announced, it was found that the cost of carrying goods through the canal with tolls was 40 per cent below what had been expected, *without tolls*. This was the sole remaining barrier to future success for Western business through the canal removed. It was now certain that the great bulk of produce destined for Pacific Coast points must come by water to these ports for distribution to local centers of consumption.

Not to be outdone in generosity to the West, the Interstate Commerce Commission, in the now famous long and short haul case and that of the intermountain rates, gave decisions that were of the greatest possible value. As a result of these new decisions, the railroads may compete with the water rate established

through the canal only at the expense of demoralization of much of their intermediate business. It is to be assumed that the railroads will prefer to handle business from San Francisco, for example, to interior points at a profit, rather than from Eastern points to these same places by rail at a loss. The effect of this new order will undoubtedly be felt as far east as the Rocky Mountains, and the Western business man may now look confidently for results in the territory naturally tributary to Western points. Pacific Coast cities that were the termini for perhaps two or three railroads now have become the beginnings of great railroad systems.

It may now be assumed as a natural consequence that Middle Western manufacturers will establish factories on the Pacific Coast to provide for Pacific Coast business. The rapid increase in population of the districts included presents an attractive aspect to the man who contemplates such a move. There are now six million persons west of the Rocky Mountains and half of this number are in California. It is admitted that the West is growing more rapidly than any other section of the United States, and California, with its innumerable opportunities, its inexhaustible resources, its ability to sustain a great population, will continue to increase and become with each passing year a greater factor in trade, a greater market for commercial and industrial activity.

Another perfectly natural outcome of the opening of the Panama Canal has been a stimulation of interest in the development of natural resources in California. It has become apparent to every thinking individual that if ships are to come in large numbers to this coast laden with raw material as well as finished product for distribution in the Western arena of trade, they must not go away empty. Thus new impetus is given to manufacture from locally produced material; from the abundant natural resources of the State will be drawn supplies with which to manufacture vast quantities of desirable goods for which there is a waiting market in the Orient, in the southern portion of our own

continent, and elsewhere. This means a marvelous growth for California; its products will move at practically half the freight cost under the new order.

It will be interesting to note the rapid development of coast-to-coast traffic across the Isthmus even before the opening of the canal. For example: Coast-to-coast tonnage via the Isthmuses of Panama and Tehautepec has increased 446 per cent in the last six years. According to figures of the Department of Commerce and Labor for the year ending June 30, 1913, the total value of all goods shipped via both isthmuses amounted to \$131,556,285, of which \$87,564,507 was westbound and \$34,991,778 was eastbound. The leading articles of shipment ranked as follows: Westbound—Manufactures of iron and steel, \$18,755,779; manufactures of cotton, \$11,067,774; manufactures of paper, \$6,467,774. Eastbound—Wines, \$4,044,320; fruits, \$3,708,094; wool, \$33,469,217; canned salmon, \$2,129,703. The largest eastbound item was sugar from Hawaii to the Delaware Breakwater, amounting to \$19,309,351.

The first year's tonnage through the canal should easily reach the million mark, with a valuation of \$150,000,000.

Figures thus far compiled regarding movements through the canal show the following interesting facts:

Two hundred and fifty-seven vessels used the Panama Canal before December 1, 1914. Two hundred and twenty-seven were laden.

By principal routes, and with an indication of the tonnage on which tolls are assessed, this traffic may be summarized as follows:

	<i>Vessels</i>	<i>Tonnage</i>
Coastwise, eastbound.....	54	320,155
Coastwise, westbound.....	61	282,020
U. S. Pacific Coast to Europe.....	34	248,020
Europe to U. S. Pacific Coast.....	8	38,318
South America to U. S. and Europe.	24	166,917
U. S. and Europe to South America.	15	74,644
U. S. Atlantic Coast to Far East....	24	148,207
Miscellaneous routings.....	7	19,203
Vessels without cargoes.....	30	.....
Total	257	1,297,484

The tolls collected on this traffic aggregated \$1,135,205. Collections of tolls began May, 1914, when barges were first permitted to use the canal and assumed considerable volume with the opening of the canal on August 15 to ocean-going vessels.

As may be supposed, the harbors of the Pacific Coast, in anticipation of the immediate business and the future volume certain to result from the new order of things, have made or are making provision for adequately handling the situation. San Francisco harbor front, for example, which is owned by the State of California, is now being fitted with new docks and wharves under a State bond issue of ten million dollars. The interest on same, and all sinking and redemption funds, are paid out of the revenues derived from the harbor.

The Bay of San Francisco covers an area of over 420 square miles and has a shore line exclusive of navigable inlets, of 100 miles. The city and county of San Francisco, consolidated, has a water frontage on the bay of ten miles. The pierhead line is 800 feet from the bulkhead line and is fixed by the United States government.

On January 1 of this year there was a total completed seawall 18,690 feet in length; 34 completed piers and three planned, from 600 to 1000 feet in length and from 100 to 200 feet in width. The total berth space of all piers is 48,728 lineal feet. The dock area of all piers is 3,471,697 square feet.

The Embarcadero, the street fronting the harbor, is also owned by the State, which operates a belt line railroad over its entire length. On January 1, 1915, the belt line was 20,600 feet long. Freight can be un-

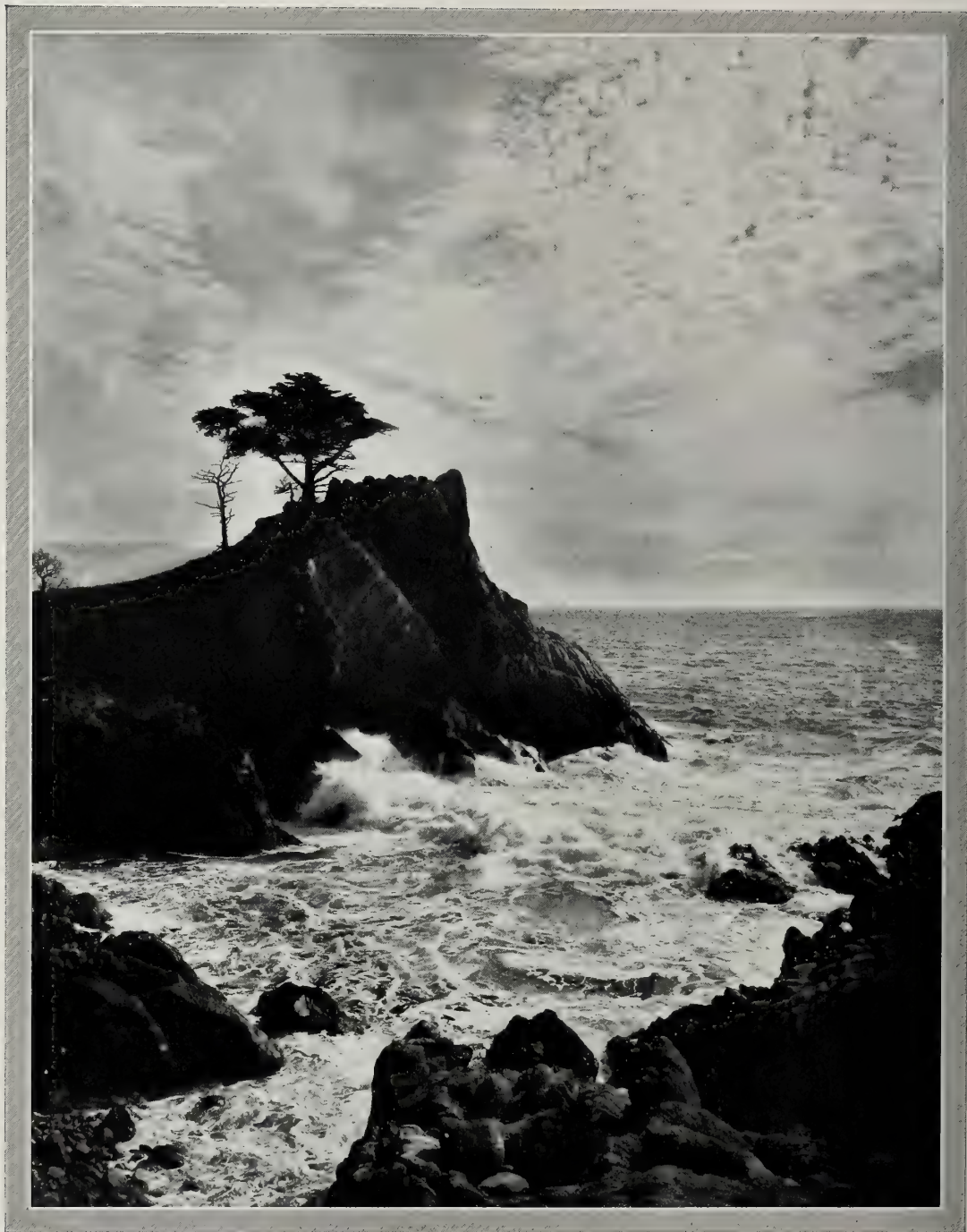
loaded directly on the freight cars on the belt line from the freighter alongside the dock (the belt line being connected with the main lines of all transcontinental railroads, and the spur tracks serving San Francisco's industrial area), so that freight can be transferred direct from steamer to warehouse or factory.

Deep water is found at all docks and wharves on the San Francisco water front. Typhoons and hurricanes are unknown, and the greatest liners dock without difficulty in any weather and at all stages of tide. Ten fathoms is the average depth in the bay, affording safe anchorage at all times. A depth of six and seven fathoms is reached at the ends of all piers. The only transport docks owned by the United States are at San Francisco.

Nor is San Francisco the only California harbor to directly benefit by the opening of the canal, or that is prepared to handle the increased business. San Pedro, San Diego, Oakland—all have havens for shipping, all are planning for great future development, and are already feeling the effect of the opening of the great world waterway.

So the Westerner, when he has the time to spare from his work, may turn his gaze eastward, envisioning new horizons, glimpsing in his mind's eye the shores of distant lands, with which he may now have traffic under conditions profitable and otherwise satisfactory to all parties concerned.

THESE has never been a time in the history of California when greater opportunities existed for manufacturing enterprise than today. The opening of the canal is creating a veritable revolution in trade and industrial conditions. New fields are spread before the Western manufacturer and business man. There are sites for factories, opportunities for investment, that will be unavailable unless taken advantage of almost immediately. Our Service Department is in a position to supply information on this subject and to obtain options for those who are ready to take advantage of the great chances that exist today in California. Nothing is ever gained by procrastination except cause for lasting regret. The man who succeeds is the one who continually seeks means of advancing his facilities. The California manufacturer or business man works amid conditions that are ideal and with transportation facilities tremendously enhanced by the opening of the world's greatest waterway.



Where the stirring song of the sea sounds eternally and the surf is whipped to foam upon the jagged rocks of Midway Point, Monterey

The Panama Canal in *Its* Higher Meaning

By Adam Hull Shirk

Editor's Note: By reason of the fact that Mr. Shirk, through wide reading and study as well as much personal experience, has acquired a grasp of the meaning of the greatest achievement of modern times in the higher sense, he has been called upon to write of the Panama Canal from that viewpoint. His article leaves a clear impression of greatness upon the reader. Mr. Shirk has become identified with the California Publishers' Co-operative Association permanently and is expected, as a result of his humanitarian principles and sympathetic appreciation of the requirements of the people, as well as of the indubitable greatness of this State, to accomplish much for the organization in aiding in the attainment of its highest ideals.

IN SO FAR as any work of man may attain to a semblance of deific proportions, the construction of the Panama Canal represents the apotheosis of human labor. The greatest workers in every age have also been its greatest poets, for Calliope has not withheld her gifts from those whose epics have been written in stone rather than upon parchment. The Panama Canal is an epic, and every drop of water that courses through it, mingling the Pacific and Atlantic, will sing the song that was written to the mighty tune of steel upon steel and steel upon stone; written with earth-rending blasts upon the very breast of Mother Nature.

All the labor that makes for progress, all the work of man that is worth the while, all the dreams that reach a practical solution, all the ambitions that deserve to be realized, all the thoughts that partake of eternal quality, are founded upon constructive principles. The history of the universe, and of this terrestrial ball whirling in the uncharted reaches of space, is constructive. Destruction has no part in the

plan of Him who looked upon his finished labor and saw that it was "very good." What may have seemed afterward to have been born of some cataclysmic thought was never such in the mind of the Creator. Otherwise there would have been no reason in the eternal scheme of things. One does not build up in order to tear down unless there is a mental unbalance upon which such a paradoxical state of thought may be blamed. And surely no man dare say that the Mind which has held the stars, the planets, the constellations in their courses, has ever been less than perfect.

Such wrong mental attitudes can be attributed to men, and their outcome is war and waste, hatred and want, fire and sword and pillage and rapine and destruction. In an age when the thoughts of a certain percentage of humankind run along such destructive channels, it is cause for rejoicing, a mental weapon wherewith to combat the whisper of supreme evil that would have us believe that all things are for naught and that existence itself is a

mistake, to realize that such a titanic work as the Panama Canal, such a constructive accomplishment, a labor which will benefit the world's people as a whole, should be brought to a triumphant conclusion. To know that only great and good ends have been served, that men have been brought closer to one another, that in a spirit of profitable and honorable trade they may yet learn the advantages of peace—to know that such is the meaning of the Panama Canal is most satisfying and reassuring to those who find it hard in times like these to preserve a spirit of optimism, to prevent themselves being drawn under by the maelstrom of the black waters of selfishness, rapacity, and hatred.

Is it not, as yet, too early to say what the Panama Canal really signifies to the world? At best we can only surmise and doubtless the passing years will discover new ends that will be served by this gigantic waterway, new benefits to be derived that can not even be conceived of now.

PRIMARY PURPOSE

Primarily the purpose of the canal is, speaking commercially, the shortening of distances for oversea traffic. To even the lay mind it will be patent that, given a line of steamships running between two ports, great benefit is certain to accrue from a considerable reduction of the distance to be covered.

It is scarcely within the province of this paper, however, to enter exhaustively into the commercial aspects of the canal, however much this may be said to be the fundamental object of the great work. This feature has already been handled in a comprehensive manner in this volume by men who are familiar with the subject from every angle. Nor is it possible for any one, no matter how well informed, to treat of the Panama Canal in its entire scope. It touches so many phases of life, will have a reorganizing influence upon so many lines of endeavor; in its potentialities offers so extensive a vista for the prospective vision, that the mind halts, is staggered, by the cumulative facts and possibilities, actualities, and speculations. It is then that the great fact is

brought home in all its intensity—the fact that a work of such magnitude holds more than even a generation of men can conceive, that it is, in more than the literal sense, created for all time. In short, it is something greater than a work of mere human ingenuity; it includes inspirational qualities of the highest order. In its inception, and throughout the multitude of vicissitudes down to its actual completion, the building of this great waterway required the accumulated brain force of many master minds, and it is therefore reasonable to infer that no one man can hope to gauge its greatness, reckon its future effect upon the world, or even detail, save in the most sketchy manner, the true history of its construction. How many defeats, how many failures, how many triumphs went to the making of this canal! How many men have lived and died since it was first begun! What changes will it bring about in our civilization, what blending of nations, what resultant effect upon the characters and the development of future generations! This may seem an extravagant view of the matter, but when any one will stop to consider what it really signifies, it will be seen that the entire gamut of emotions is run in the contemplation and execution of the work. Tragedy to comedy; shattered dreams, realized ideals; Napoleonic ambitions, humanitarian visions—all have been experienced in this vast feat of engineering, indissolubly linking the poet in stone with the poet in parchment, as I said in the beginning, proving the inevitableness of the assertion that all men partake of the same characteristics, and, in greater or lesser degree, dream the same dreams, are influenced by the same ultimate desires, and that all these ultimate dreams and desires are fine and big and beautiful. It is only the elemental in us that inclines to destruction, for man, like the Creator, is a constructionist by disposition. He finds no real pleasure in tearing down; he does gain a real joy in building up. This is seen in the fact that no sooner has the nation which has been at war returned to the ways of peace, than it straightway sets about rebuilding. This is not only for economic rea-

sons. If man were really the savage beast he seems to be when at war, in peace he would be no less so, and might dwell contentedly amid the ruins of his own making, satisfied to live as his primitive forebears. Education, civilization, you say? Then why have not education and civilization saved him from war and waste? The truth is he fights because he allows the spirit of the wild beast to enter his mind and take possession of his citadel of reason. When he becomes himself again, he realizes his error, sees about him the horrible reminders of his colossal mistake, and sets about repairing the damage. His sense of the beautiful, his sense of fitness, both are offended by the chaos. He is a constructionist. He would put his house in order.

And so we are led by tenable lines of reasoning to the assumption that the Panama Canal, built if you will for commercial purposes, is in its ethical qualities, a monument to the constructive nature of mankind. It is a lasting temple to the glory of labor, to the everlasting honor of the builder.

PERSONALITY IN THE WORK

If, in the latter days of the construction of the canal, one man's personality stands out in bold relief more than another's, it is that of Colonel George W. Goethals, chief engineer and chairman of the canal commission, under President Roosevelt's appointment in 1903, and first governor of the Panama Canal by appointment of President Wilson in 1914. Coming of sturdy Dutch stock, he retained pre-eminently the characteristic of rigid adherence to his line of duty which was typical of his ancestry. He also displayed rare judgment and foresight, great engineering and executive ability in his administration of the difficult problems set before him in the so-called "thirteenth labor of Hercules." A graduate of West Point, Colonel Goethals had the good sense and rare judgment, nevertheless, to refrain from any exhibition of militarism in his direction of the affairs on the isthmus. Had he been a soldier of the martinet type he would have seen a complete demoralization of affairs, for much uneasiness had been occa-

sioned by the change from civil to military direction. But Colonel Goethals never wore a uniform, and declared that, to quote from an article by Mr. Joseph B. Bishop, former secretary of the Isthmian Canal Commission, in *Scribner's Magazine*, "there would be no more militarism in the future than there had been in the past, and that no man who did his duty would have cause to complain because of it."

To quote further from the same source: "He (Colonel Goethals), is one of those rare persons whose mental vision is not hampered by full knowledge of details. He uses that knowledge as the foundation for a broad, general view of the field of action, with every portion of which he is familiar. He is not only able to see all phases of the problem as it exists today, but to foresee the questions that will arise in the future and prepare to meet them. He has in rare degree the gift of sagacity, without which there can be no successful leadership."

And this, I think, sums up admirably the qualities that have made Colonel Goethals, in the very general, if not entire, consensus of opinion, the ideal man for the work.

NOT A NEW PROBLEM

Prior to as well as contemporary with Colonel Goethals in the history of the canal have been many notable personalities, which have represented presidents, statesmen, engineers, legislators, discoverers, navigators, soldiers. For the first actual consideration of the great undertaking was 394 years before it became an actuality and it has been a perennial subject of contemplation during the interim. After Balboa entered what he termed the "South Sea" and claimed it by right of discovery for his royal master, the King of Spain, Pedro Arias de Avila, who was responsible for Balboa's execution, appears as the next in line of those connected directly or indirectly with the canal, and during his regime, the city of Panama was built and constituted a city by royal decree. In the report of the Isthmian Canal Commission, 1899-1901, it is recited that "the importance of a maritime connection and the discouraging results of the efforts to

discover a natural channel between the two oceans suggested to many minds the idea of a ship canal." This was in 1520 or thereabouts and it is recorded that Charles V directed that the Isthmus of Panama be surveyed with this purpose in view at that time. But the reports of engineers were discouraging and the work was not then undertaken. One can only conjecture what might have been the resultant effects upon history, what the changes in our maps, had the project been successfully carried out in those early years.

PROGRESS SLOW

Perhaps it was the characteristics which have been often attributed to the Castilian race that were responsible for the fact that, during the 300 years of Spanish occupation, no actual progress was made in the way of establishing a maritime connection between the two oceans. Baron von Humboldt here appears upon the scene, displaying a decided and intelligent interest in the problem. His writings were read with interest and sufficient credence to induce

the Spanish Cortes, in 1814, to pass a decree for the construction of the canal through the peninsula for vessels of the largest size and which provided for the formation of a company to carry out the project. But it led to nothing as usual and Spain lost all chance of obtaining the glory that might have accrued from the successful completion of such an undertaking, when, in 1823 the last of her South and Central American provinces succeeded in establishing their independence.

From 1814 to 1869 only similar abortive attempts were made. During that period railroad enterprises providing for transportation facilities across the isthmus were fostered, and the Panama Railroad Company succeeded in establishing a line which was built at great expense in money and human lives, though in extent it was but a trifle over forty-seven miles. It was opened to traffic in 1855.

AMERICA TAKES A HAND

In 1869 President Grant in his first message to Congress advocated an American canal,

THERE'S the man on the steam drill. His dentistry of the earth's crust is to be observed whenever an excavation for building foundations is torn out of the solid rock. Without his preliminary labor neither dynamite nor derricks avail. His weighted tripod is set up. The long drill rod is fixed in place. The steam is coupled on. Then begins the ceaseless *pfutt—pfutt—pfutt*—in explosive snorting. A helper, with a tin can attached to a stick, pours drink after drink into the drill hole. Unconcerned the man perches on the drill. He balances himself erect on the bucking tripod or sits gracefully on a projecting seat like the outrigger of a sailing canoe. The pulsation and din of his machine do not move him. The spurting plume of steam sometimes half conceals him; he sits reposeful but alert. Derricks carry their loads over his head. Huge boulders and barrows full of splintered rock swing by, lurching and oscillating just above him. He does not heed them, rarely even looks up. The thunder of a blast not far away hardly makes him turn his head. The thrill and panoply of the battle field are not for him. He makes no gallery play for the benefit of the onlookers who all day long line the brink of the yawning excavation. His attention is given to the quivering machine beneath him. Without him and his brothers the Panama Canal could never have come. Here is a hero of peace—steadfast, unassuming, and masterful.—*Editorial in "Collier's."*

and Congress responded by adopting a joint resolution providing for further exploration of the isthmus. In 1872 a second resolution authorized the appointment of a commission to study the results of the explorations, and to obtain information relative to the feasibility of a canal. This commission reported in 1876 advocating what it termed the "Nicaragua Route," as offering fewer obstacles and presenting greater advantages for the construction of a canal, than any other. The report was not transmitted to Congress till three years later.

FRANCE ENTERS FIELD

About this time, in 1876, to be exact, France entered the field as a supporter of Lieutenant L. N. B. Wyse, who made a contract with the Colombian government to build a canal across the territory of the republic. Later the contract was modified so as to give to the promoters the exclusive right for ninety-nine years of constructing a canal as covered by the original contract. The general route was to be determined by an international congress of engineers to be assembled not later than 1881. So the International Scientific Congress convened in Paris in 1879 and decided in favor of the route from Colon (Aspinwall) to Panama. The concession held by Wyse was transferred to the Panama Canal Company, known officially as "La Compagnie Universelle du Canal Interocéanique de Panama." Why record in detail this "grande fiasco"? Suffice to say that in 1889 the bankrupt company was dissolved by a judgment of the "Tribunal Civil de la Seine" and work finally suspended on May 15 of the above mentioned year. The notorious Ferdinand de Lesseps was president of the ill-fated "compagnie."

The liquidator appointed a "commission d'études" to study the project which later submitted an estimate of the expense which would be attendant upon the construction of a lock canal. In 1894 the New Panama Canal Company was organized and took over all of the canal property except the Panama railroad shares. Work was resumed in a small way and continued until 1899, at which time the excavation had been enlarged to some extent and

several millions of additional dollars buried in the sands of the isthmus.

Here the alien element in the until then ill-starred enterprise virtually bade farewell to the work.

COMMISSION APPOINTED

President McKinley, authorized by an act of Congress approved March 3, 1899, appointed a commission to investigate the Nicaragua and Panama routes, as well as any other possible routes, the value of a canal from all angles, and the rights and privileges. The members of the commission convened in June of the same year and began their labors. They visited Paris and examined the plans, maps, and data of the New Panama Canal Company, now exceedingly anxious to dispose of its holdings, and exceptionally courteous to the commissioners from the United States.

After a trip to Nicaragua and exhaustive investigations the commission submitted its report to the President toward the end of the year 1901. The work was concentrated upon the Nicaragua and Panama routes, though four others were considered and estimates were furnished therefor. The report was comprehensive, going into minutiae of costs; routes were compared, and endless correspondence and negotiations resulted, the final conclusion and recommendation transmitted to Congress in December, 1901, being as follows:

"After considering all of the facts developed by the investigations made by the commission and the actual situation as it now stands, and having in view the terms offered by the New Panama Canal Company, this commission is of the unanimous opinion that the most 'practicable and feasible route' for an isthmian canal to be 'under the control, management, and ownership of the United States' is known as the Nicaragua route."

This, however, was not the end, and the Nicaragua project went a-glimmering, despite the recommendation, when the commission later addressed a further communication to the President, submitting the proposition of the New Panama Canal Company to sell and dispose of all its rights, property and unfinished

work to the United States for \$40,000,000. The report went to the Senate. Congress empowered the President to make the purchase and to acquire a strip of land across the isthmus from Colombia. A treaty was negotiated by Secretary of State John Hay, with a Mr. Herran representing Colombia. The United States ratified this treaty in 1903, but the Colombian Congress rejected it. Then followed the throwing off of the yoke of Colombia by the state of Panama. This occurred November 3, 1903.

A WONDERFUL RECORD

The history of the subsequent negotiations with the new state of Panama, the transfer of the property and rights of the canal company to the United States, the continuation of the work at first along the lines of the former concern, the appointment of new commissions, officials, and others, down to the actual completion of the great waterway and its opening, forms a record of tremendous activity, painstaking effort, precautions of the most elaborate sort in the matter of sanitation, which have resulted in a great reduction of the mortality in the Zone, and has culminated in a triumph of administrative and executive ability and of engineering skill that has brought laurels to many men and given finally to the United States of America, the honor of accomplishing the greatest feat of modern or ancient times, beside which the building of the Pyramids and the construction of the Assouan dam sink to comparative insignificance. Particularly is this true when we consider the advantages to the world and its peoples accruing from this uniting of the waters of the two

oceans and the resultant decrease in distance between the most important points of commercial intercourse.

In a recently published article Mr. Isham Randolph, C. E., D. E., a member of the board of consulting engineers for the Panama Canal, of the advisory board of engineers, 1909, etc., says:

"All American engineers glory, with the American people, in the achievements in Panama of the men of the corps of engineers of the United States Army. In many fields that corps has built up and sustained a reputation for ability, honor, and integrity, which is a glory to the service; but we civilian engineers would not have our countrymen forget the part that our unbrevetted fellows bore in the building of the Panama Canal. Goethals, Hodges, Sibert, Gaillard will always be foremost in the thought when the building of the great canal is under discussion; but I do not believe that they forget, or for one moment under-rate, the support they had from Williamson, Goldmark, Schildhauer, Zinn, Saville, Nichols, Cornish, and others who supplemented their efforts from start to finish."

This graceful acknowledgment fittingly sums up the work that has been nearly four centuries in the making.

VARIED PHASES

There are innumerable phases of the commercial importance of the canal to which, despite my initial reservation, it is almost impossible to avoid referring at least briefly. Some of these are summarized succinctly by Mr. A. C. Laut in a recent periodical contribution:

NATURAL conditions on the Pacific Coast have made possible a remarkably rapid development of that territory in the last sixty years. Its future development, to which the Panama Canal will contribute, will be even more rapid. The present tendency is toward development of a constantly more intensive character. This, together with an ever broadening market for its products, will result in greater prosperity.—*Thomas H. Means in "Commercial and Financial Chronicle."*

"New fleets under the American flag. Pacific Coast products on Eastern markets at low freight. Middle West exports on the Pacific Coast by water. A new era in Asiatic commerce through American channels. American ships picking up South American commerce, abandoned by German and British lines."

The meaning of the canal to Latin-America is of tremendous significance, implying that those countries known commonly as South and Central America, will now be developed along the lines of trade wherein they have hitherto been decidedly backward—particularly Central America. The possibilities for import and export, with the opportunities to be derived from the canal, admit of much speculation, the least sanguine of which assures a great increase in both respects.

HARBOR DEVELOPMENT

The completion of the canal has also meant much to California in the impetus it has given to the development of the harbor of the coast. The opening of the waterway has meant the avoidance of the mountain barriers which in the past have separated the Pacific Coast from its true source of sustenance. Therefore the improvement of harbor facilities in all Pacific Coast ports has become absolutely necessary and not merely a pleasing subject for speculation. It is a pressing need, a thing of today, not tomorrow. And generally, when a matter becomes vital, ways and means are found to accomplish what is needful, despite the obstacles, real or fancied, that have heretofore blocked progress.

Along some 1500 miles of coast, extending from the Mexican border northward, there are eight major port developments in progress, aside from numerous minor projects. Each one possesses problems that are peculiar to itself. It is the opinion of harbor experts, in a nutshell, that a port should be considered as the connecting link between the highways of the land and those of the sea, and this has been borne in mind by those in whose hands rests the work of developing the harbors of the Pacific Coast. Thus, San Diego, actively employed in making her harbor ready for the big

ships that will reach her port first on their journey up the coast, is to have a railroad, now building, to open up the hinterland. This line will in time, it is confidently believed, reach back to Grand Junction, Colo. Through this port undoubtedly much freight will move to and fro, serving Arizona, New Mexico, and further Eastern points. San Diego has thrown off any apparent lethargy, a legacy (little to be desired in these modern days of hustle, however romantic its tendency), from the old days of the padres, and has awakened to the importance of its position in the scheme of maritime commerce. Its present day activities in harbor development, its exposition, its railroad work—all evidence that the days of *dolce far niente* are gone forever.

LOS ANGELES HARBORS

Something less than a hundred miles north of San Diego is Los Angeles, which has by the absorption of Wilmington and San Pedro, on the coast, provided itself with a means to an end, that end being a harbor. In this respect she was face to face with large obstacles, since protection from the drive of the ocean was essential to the formation of any sort of successful port. With government aid a breakwater was built, which embraces within the curve of its protecting arm 960 acres of outer harbor. The inner harbor is being constructed in what was once a slough and delta of the San Gabriel and Los Angeles rivers, at the entrance of which a splendid concrete pier is being built.

It is an admitted fact that San Francisco Bay is the most important port on the coast. How important it is can best be gathered from the following tribute paid it recently by General Chittenden of the Seattle Port Commission. He said:

A TRIBUTE

"Whatever changes the future may have in store, it is now true, and for a long time will so remain, that San Francisco Bay is far and away the most important port on the coast. It is a wonderful port—wonderful in the strategic relation to its California hinterland and the great interior of the country; wonderful in its

physical conformation as a vast sheltered harbor opening in, through a narrow and easily defended entrance, from a coast line almost devoid of harbors in either direction for hundreds of miles; wonderful in its romantic history; and wonderful in its relation to the commerce of the world. Nature wrought a masterpiece when she made San Francisco Bay. Its great expanse and its navigable connections north and south, through the rich valleys of the San Joaquin and Sacramento, fit it perfectly for the great *entrepot* of a vast empire. The work of nature was supplemented by the good offices of fortune, which early turned the attention of the world to this port and laid the foundation of its future greatness so deep that neither earthquake nor the growth of rivals can shake it. The Golden Gate—named three centuries before, in beautiful prophecy of the Argonauts of '49, whose anchors dropped into yellow sands brought down by the slickens-laden streams of the Sierra—was the scene of a mighty commerce while yet only random traders sought the furry wealth of the harbors farther north. The first transcontinental railway had its traffic into the Sacramento for twenty years before any other portion of the coast was similarly favored. San Francisco has written the most important chap-

ter of her history while her sister ports are still almost unknown to the world. Congress did well when it selected the California metropolis as the site for the celebration of the opening of the canal. What a contrast it will be—the struggling mass of humanity and freight on its way across the fever-stricken isthmus to the land of golden promise in '49, and the floating palaces which will then pass safely through Culebra Hill to a scene of resplendent riches undreamed of by even the wildest imagination of sixty-six years before!"

EAST SHORE IMPROVEMENTS

The east shores of this wonderful bay afford remarkable evidences of development extending southward from San Pablo and Suisun bays. The greater part of this is included in that section lying between Oakland and Alameda on the San Antonio estuary, which has received government aid and is known officially as Oakland's Inner Harbor. In all there is here afforded some fourteen miles of shore line. The harbor has become a really great industrial center, possessing docking space for large and small ships, dry docks, etc. Colonel Thomas, U. S. A., in a general plan for future development of this side of the bay, treats the water fronts of Richmond, Berkeley, and Oakland as one unit. If carried out as planned

IN GENERAL it is the common interests of mankind that will be promoted by the use of the Panama Canal, and the gains will be those in which all nations will participate. If we divide the world into two hemispheres by a meridian running through the Pacific and the Atlantic, the commercial center of one hemisphere will be at Panama and that of the other at Suez. At these points routes innumerable intersect, and through each of the artificial straits will pass an ever-increasing volume of commerce. Relatively the increase of the traffic through the Panama Canal will be the greater, and long before the time when the full economic transformation of the Pacific countries will have been established it will take more than one channel across the American isthmus to accommodate it. No traffic which the present generation will witness will constitute a tithe of that which will be seen in the future, and no figures that any one would now dare to make will measure the wealth that will ultimately flow from it.—"*Commercial and Financial Chronicle*."

some ten miles of shore line for pier construction would be provided. Concerted action is at present a matter of speculation, however.

Enough has been said to show that the coast of the Pacific is well provided with harbors and it need only be added that in every case the development of these natural advantages is being pushed to the extreme limit, in contemplation of a demand for every facility as the result of the canal opening. Even the temporary unsettling of trade conditions as the result of the European struggle has not deterred or discouraged this activity noticeably.

INLAND WATERWAYS

Inland waterways are not being overlooked in the general scheme of aquatic development and the government has not been backward in providing funds for the improvement of navigable channels connecting with the bays just described, and the State has co-operated so that a large amount of work is in progress which was recently summarized by Mr. Paul M. Norboe, assistant state engineer, as follows:

WORK NOW IN PROGRESS

The work now in progress under the current federal and state appropriations for the benefit of navigation may be summarized as follows:

By the United States war department:

Cut-offs on San Joaquin River, snagging and jetties on Sacramento.

By the war department in co-operation with the State: Widening the mouth of Sacramento River, debris control, survey of San Joaquin River to Tulare Lake.

By the state department of engineering: Bank protection at Collins Eddy, Sacramento, \$8000; bank protection, Riverside, Sacramento River, \$75,000; snagging, Feather River, \$300; bank protection, San Joaquin below Stockton, \$1136; bank protection, San Joaquin above Stockton, \$40,200.

Work now in progress the results of which are collaterally in the interests of navigation:

By the United States reclamation service in co-operation with the State: Surveys for reservoir sites in headwaters of Sacramento River. By the United States geological survey in co-

operation with the State: Stream measurements on all important tributaries of navigable streams. Topographic survey of the great valley from Red Bluff to Bakersfield. By the state department of engineering: Surveys for flood control, Sacramento and San Joaquin rivers. By the reclamation board: The direction of all private reclamation projects so as to conform to the plans for the ultimate complete reclamation and flood control projects in Sacramento and San Joaquin valleys.

CANAL STATISTICS

Reverting to the primal cause for the major portion of the activity that is today apparent upon the entire Western hemisphere, the Panama Canal—it may not be amiss to append a few statistics regarding the cost and size of the great waterway, and of the advantages in distance gained by its existence:

Figures as to the length of the Panama Canal, its various sections and cost of construction:

Length from deep water to deep water (miles)	50
Length from shore line to shore line (miles)	40
Bottom width of channel, maximum (feet)	1,000
Bottom width of channel, minimum 9 miles, Culebra Cut (feet)	300
Locks, in pairs	12
Locks, usable length (feet)	1,000
Locks, usable width (feet)	110
Gatun Lake, area (square miles)	164
Gatun Lake, channel depth (feet)	85 to 45
Culebra Cut, channel depth (feet)	45
Excavation, estimated total (cubic yards)	182,537,766
Concrete, total estimated for canal (cubic yards)	5,000,000
Time of transit through completed canal (hours)	10 to 12
Time of passage through locks (hours)	3
Relocated Panama Railroad, estimated cost	\$9,000,000
Relocated Panama Railroad, length (miles)	47.1
Canal Zone, area (square miles)	448
Canal and Panama Railroad force actually at work (about)	35,000
Canal and Panama Railroad force, Americans (about)	5,000
Cost of canal, estimated total	\$375,000,000

DISTANCE ADVANTAGES OF THE CANAL

How much closer the Panama Canal will bring California ports to the great harbors of the East coast and of Europe can be understood from the following table. In it the dis-

FORMERLY Pacific Coast products for European markets were trans-shipped at Atlantic harbors from rail to sea. What is to hinder these products going direct to Europe without breaking bulk at Atlantic ports?—*A. C. Laut in "Review of Reviews."*

tance from Los Angeles is computed, showing the saving by passage through the canal instead of by the Straits of Magellan or going round the Horn. The table follows:

From	Via Panama	Via Magellan	Gain Panama
New York.....	4,799	13,214	8,415
Norfolk.....	4,597	13,140	8,543
Charleston.....	4,398	13,149	8,751
Port Tampa.....	4,033	13,313	9,281
New Orleans.....	4,198	13,614	9,416
Galveston.....	4,299	13,796	9,487
Liverpool.....	7,538	13,584	6,046
Hamburg.....	7,967	14,034	6,067
Antwerp.....	7,688	13,755	6,067
Bordeaux.....	7,438	13,271	5,833
Gibraltar.....	7,472	12,653	5,191

ECONOMIC CHANGES

That the Panama Canal is already causing and is destined to cause far greater economic changes, goes without saying. Vexed questions of rates are being settled; immigration, for the time being sadly affected by the European war, will present an entirely different aspect; the competition between rail and water for transportation will naturally become a source of considerable activity, though eventually destined to result in co-operation rather than competition. There must and will be readjustments all along the line, but when things have settled into an equable form, it will be found that the alterations in systems have resulted in the greatest good to the greatest number, at least. The canal is another link in the chain of world transportation and, thus far, the greatest.

In another section of this volume the Pan-

ama-Pacific International Exposition, commemorating the completion of the great canal, is described graphically by those who have been instrumental in its inception as well as personally in charge of its construction. So that there is no necessity for my adding anything to what they have written other than to submit that the exposition, in its poetic beauty, fittingly symbolizes the work which I have chosen to regard as an epic of labor.

A WONDER FOR CENTURIES TO COME

In a general way it has become almost a truism that the wonder of today is the commonplace of tomorrow. In an age when progress in every line of invention and discovery has become so rapid as to cease to be a subject of surprise or even comment in many instances, it takes a great deal to stir the average man or woman out of his or her aplomb. Particularly is this true in America of Americans. But the Panama Canal is almost beyond mere wonderment. If, through the fact that it has been long in the making, it has become so familiar to the minds of the people as to almost lose its true significance, then it is time that all should realize the stupendous nature of the work. It is greater than we can know; those who builded, "builded better than they knew." And neither tomorrow, nor ten centuries hence, unless by some cataclysm of nature, shall it cease to be a lasting triumph of human enterprise, a glorification of the spirit of achievement.

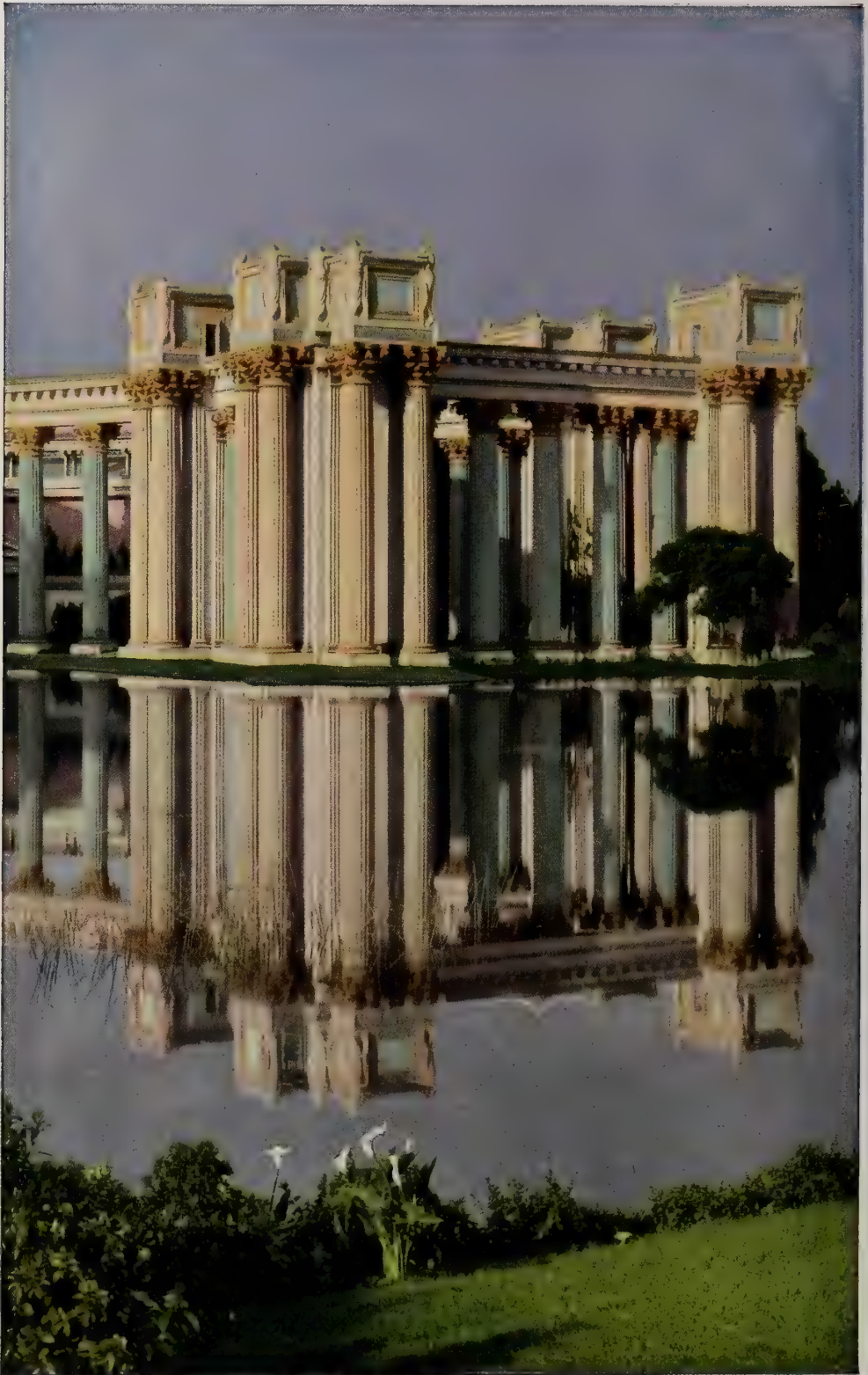
"THE CANAL will unquestionably make the Pacific Fisheries a bigger figure in the export trade than ever before."—*Miller Freeman in "Commercial and Financial Chronicle."*

The Color of the Panama-Pacific International Exposition

IN THE following pages some of the most charming scenes at the Panama-Pacific International Exposition are shown in natural colors, thereby affording a clear idea of the true wonder of the great fair. It is admitted by all who have visited the Exposition, including some of the most noted artists, that the coloring far surpasses that achieved in any similar effort in the past. The delicate pastel effects of the buildings, melting into the blue of sky and water, blending with the soft greens of lawns and foliage, are a delight to the eye and convey a subtle suggestion of restfulness and peace that is one of the greatest charms of the Exposition.



A portion of the "Arch of the Setting Sun," at the Western end of "Court of the Universe." On the right is shown one of the Du Mond mural paintings



Like a painting by Maxfield Parish, or a restoration of some classic temple, is the Fine Arts Palace, of which the colonnade is here shown reflected in the limpid waters of Fine Arts Lagoon



Two splendid Italian towers mark the entrance to the Court of Palms. In the foreground the South entrance to the Palace of Liberal Arts is seen



This panoramic view of a portion of the Exposition was taken November 20, 1914, from the woods. The Island of Alcatraz is seen in the distance.



A part of the Northern Facade of the Exhibition Palaces fronting on the Bay of San Francisco is shown in this view, which enhances the Exposition.



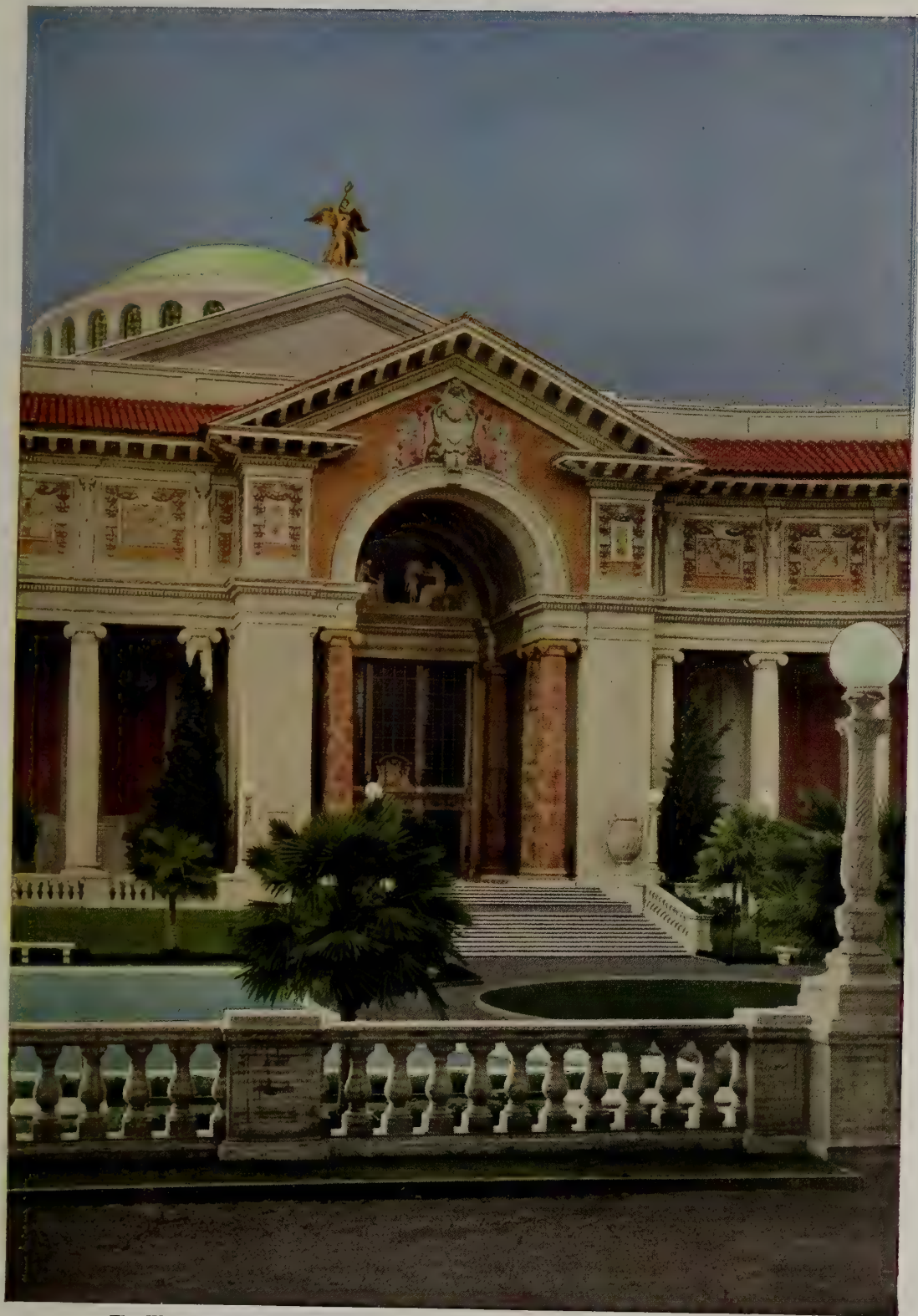
heights of the "Presidio." The big eucalyptus trees at the left obscure the Palace of Fine Arts.
seen to the right center



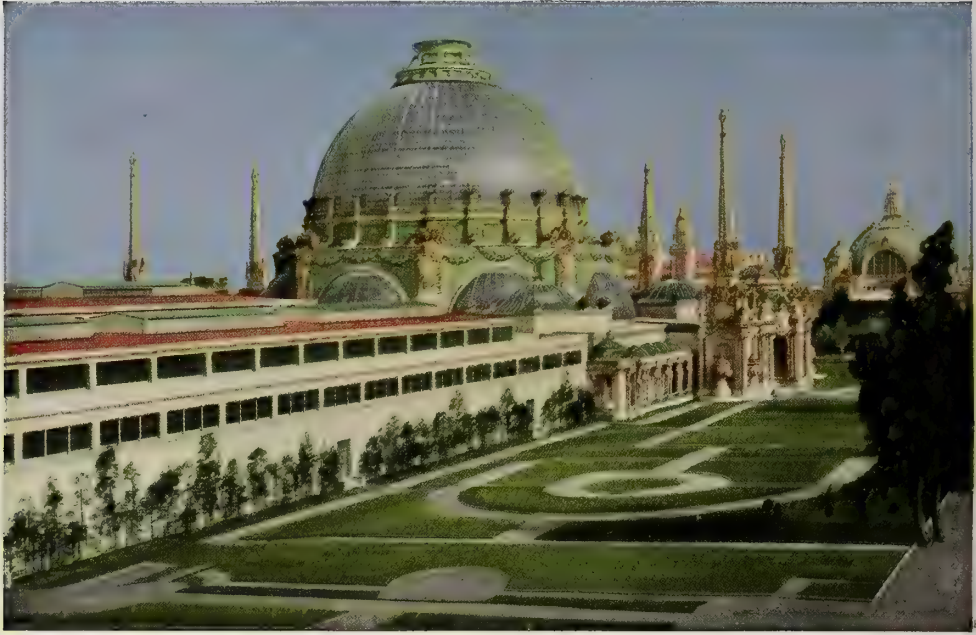
in this view. The proximity of the Pacific waters is one of the natural effects that greatly
the eyes of visitors



"Half Dome of Philosophy"—Western entrance to Palace of Education. The noble structure is reflected in the pellucid waters of Fine Arts Lagoon



The Western entrance to Palace of Liberal Arts is particularly effective. This gives also a partial view of the Court of Palms



Perhaps the most beautiful structure at the Exposition is the Palace of Horticulture, with its wonderful glass dome, rising to a height of nearly 200 feet



The niche of Autumn, one of the four typifying the seasons in the "Court of the Four Seasons"

Panama-Pacific International Exposition

A Perspective as It Is Today and a Retrospect

By Charles C. Moore

President of the Panama-Pacific International Exposition

Editor's Note: Those who have contributed in an artistic or mechanical capacity to the building of this great exposition have told of their part in the work. Others have recounted the possibilities and significance of the undertaking. But Mr. Moore, holding the highest office in the gift of the exposition stockholders, in a broad general view shows how the exposition was made possible and what its effect upon the world is likely to be.

THE Panama-Pacific International Exposition stands today completed. Viewing the vast exposition area, with its domes and spires and minarets, its lofty towers and massive buildings and garden spaces it is as though some genii had rubbed an Aladdin's lamp and brought forth the miracle. Two and one-half miles in length along the southern shores of San Francisco Bay and averaging, perhaps, one-half mile in width, with 250 buildings of varying sizes embraced in the ground plan, the spectacle, unique in its architecture, its color, its sculpture, and the prodigality of its arboreal and floral life, stands as one of the wonders of the world. In its field it is, indeed, an accomplishment as monumental as the event it commemorates—the completion of the Panama Canal, not only man's greatest engineering achievement, but the most helpful single accomplishment of its kind in the world's history.

The exposition as it stands today comes as

the culmination of many years of effort. It is an expression not only of the enthusiasm of California and of the patriotic spirit in which the American people accept this achievement of their national government, but it involves a recognition on the part of the nations as to the enduring character of the Panama Canal; of the lasting effect the canal will exert upon the civilization of the world and, at this time particularly, the exposition affords a striking testimonial of the high regard with which the United States is held by her sister nations.

The inception of a world's exposition to celebrate the opening of the canal was advanced for the first time in San Francisco on January 12, 1904, when Mr. R. B. Hale of San Francisco, now vice president of the exposition and at that time a director of the Merchants' Association of San Francisco, addressed a letter to his fellow members of the board inquiring if it would not be well to observe the opening of the canal by a universal



exposition and outlining a plan of procedure. The propriety of such a celebration was widely recognized. In Europe the press and men prominent in public life had for some time anticipated that an event of such lasting commercial importance should be fittingly recognized. Many cities in the United States sought the honor of holding the international celebration, but Congress finally decided that by virtue of her position and of the steps that had been taken, the honor should be awarded to San Francisco.

Mr. Hale's suggestion was almost prophetic and it is a wonderful commentary upon his great abilities and foresight that the plans of financing the exposition which he presented in his first letter have been followed so closely amid the unforeseen conditions that have transpired in a momentous decade in San Francisco.

In this letter Mr. Hale said: "Is the time not ripe for us to consider a world's exposition in 1915? Five years of active preparation would leave us six years to develop the interest in a proposition of immense magnitude. St. Louis raised \$5,000,000 by private sub-

scription, \$5,000,000 by municipal bonds, and received \$5,000,000 from the government of the United States. San Francisco could do the same thing and it might be possible that the State of California would appropriate \$5,000,000. This money could be raised easily, provided it seemed practicable to divide the subscription into a ten year's proposition instead of raising it all at once."

No definite action was taken at that time but the project awakened widespread interest. Many conferences were held, public sentiment was sounded and finally it was deemed that there was sufficient strength back of the exposition idea to warrant going to Congress with a bill.

Accordingly, early in 1906, a bill was introduced in Congress on behalf of a world's exposition at San Francisco in honor of the completion of the Panama Canal. In effect the bill gave notice to the world that San Francisco sought the honor of the next international exposition. Then came the earthquake and fire of April, 1906, and in the diversion of the energies of the men backing the move-

ment of the rehabilitation of their own destroyed places of business the active propaganda was suspended, but later in the year the project was revived with energy. Later, in the fall, there was introduced in the legislature of California a proposition to amend the constitution of the State so that stockholders in the exposition company should be exempted from the usual stockholders' liability.

The initial step in forming the working organization now known as the Panama-Pacific International Exposition was taken on December 10, 1906, when articles were filed for the incorporation of the "Pacific Ocean Exposition Company." Three days later the directors organized and Mr. Homer S. King was elected president.

Activity continued during December and early in January a bill was introduced into the legislature by Senator Edward I. Wolfe carrying an appropriation of \$1,000,000 from State funds "to pay expenses necessary for the proper representation of the State of California and of an exhibit of the products thereof, at the proposed international or world's exposition, to be held in the city and county of San Francisco in 1913, commemorative of the four hundredth anniversary of the discovery of the Pacific Ocean by Vasco Nunez Balboa, and to provide commissioners thereof."

But this bill, while a record of activity for State support, died by pocket veto.

The enthusiasm of the proponents of the exposition did not die. It became strengthened. In November, 1909, it was determined to interrogate representative men and 2500 queries were sent out to members of commercial bodies asking whether they favored a world's exposition to be held at San Francisco to commemorate the completion of the Panama Canal. The replies came back with such a unanimity of approval for the idea that a mass meeting was called on the floor of the Merchants' Exchange on December 7, 1909. This initial mass meeting—one of many, all marked by high enthusiasm and heartiness—determined that a committee of six be appointed to name a ways and means committee of 100 members, or more

if necessary. Meantime, Washington had been made acquainted with the ardent spirit of the exposition enthusiasts for on December 6, the day before the first mass meeting, Representative Julius Kahn introduced a new bill in Congress carrying a \$5,000,000 appropriation.

December was a big month for the exposition idea, for on the 26th the committee of six returned two hundred names which became the ways and means committee. This committee met on December 29 and a committee of three was appointed to name a directing committee of thirty, this latter committee afterwards becoming the board of directors of the Panama-Pacific International Exposition Company.

It was at this meeting, on the day after Christmas, that Mr. F. W. Dohrmann suggested the slogan: "San Francisco Invites the World." This remained the slogan for some time, later "California" being substituted for San Francisco when the exposition idea swept the State and all the counties of the State sought representation.

It began to appear, as the exposition idea communicated to other states and nations, that the original title for the corporation was not broad enough. Consequently it was decided to change the name and this was done on March 22, 1910, when the present company was incorporated. By this time the fever for the exposition was general and San Francisco was beginning to solidify in sentiment to win it, as it appeared that other cities would contest before Congress for the honor.

A mass meeting was called for the floor of the Merchants' Exchange for April 28, 1910. To those who were present at that meeting it must remain a lifetime memory. It will surely go down in the annals of California as a day throbbing with the fire, the State pride, the spirit of the pioneer to do things, that have made this great State what it is. Some had breathed a fear that the time was too short, forgetting that to the people who had rebuilt their city almost over night when a holocaust of fire had laid it low, nothing was

impossible; forgetting the blood of the pioneers that runs through the veins of San Francisco, forgetting the pride of San Francisco to do and do in a big and epochal way, anything she undertakes. Public subscriptions were called for and then began that thrilling two hours that still brings the tingle of excitement to one in memory, when the unprecedented sum of \$4,098,000 was pledged dollar by dollar by citizen after citizen, organization after organization as the hard cash and final argument of San Francisco's ability to swing the exposition.

New Orleans was now actively in the fight and the wires carried across the continent to Washington the news of San Francisco's sensational pledge of earnestness. It had its due effect.

On May 9, 1910, Congressman Kahn introduced the resolution on which the issue was joined with New Orleans. It said nothing of an appropriation because the fact had developed that Congress would not favor an appropriation. It simply designated San Francisco as the place where the canal and the discovery of the Pacific Ocean celebration was to be held.

It was thought desirable to raise more funds and another mass meeting was held on June 16 of the same year, at which time it was guaranteed that San Francisco's subscription would total \$7,500,000. At this time Gavin McNab suggested the bonding of San Francisco for \$5,000,000.

It was now time for the legislature to take action, and it met in special session on Sep-

tember 26, 1910, and proposed for the approval of the public two constitutional amendments; one to raise \$5,000,000 by state tax and the other to permit San Francisco to bond itself for the same amount. The State voted the tax amendment and on November 15 San Francisco passed the charter amendment bonding the city for \$5,000,000.

On January 31, 1911, the Kahn joint resolution, recognizing San Francisco as the place to hold the fair, won in the House by 188 to 159 votes and on February 11 the bill finally passed the Senate. How San Francisco made of that night another New Year's eve is a feature of the entire history of the progress of the exposition still fresh in the memory. The carnival spirit that only awaits expression here found its full expression that night in the greatest spontaneous outpouring in all the long history of the city's festival times.

The site was selected in July, 1911. Ground was broken by President William Howard Taft for the exposition October 14, 1911, and from that time on the history of the exposition became the history of a great business enterprise, constructed on a colossal scale, blending art with utility and keeping ever in view the dominant thing that the purpose of the great exhibit palaces was after all education: To bring to the world a review of the world in brief; an epitome of progress. We are confident we have succeeded and we await the approval of the world.

Editor's Note: In preparing the Exposition section of the Cornerstone number of CALIFORNIA'S MAGAZINE the thanks of the publishers are especially due Messrs. Hamilton Wright and Nolan Davis, editor-in-chief and chief, respectively, of the Bureau of Publication, Panama-Pacific International Exposition. Both these gentlemen have lent valuable aid in obtaining the articles and illustrations for this section and this while engaged with the tremendous amount of work which devolved upon them prior to and during the opening days of the great fair. Mr. George Hough Perry is to be congratulated upon having secured the services of Messrs. Wright and Davis in the department of which he is director—that of Exploitation—a department the importance of which can scarcely be over-estimated. Both have proved their ability to emulate the dynamo in their labors to place the Exposition before the world, the one through newspaper and periodical articles, the other in the preparation of special literature, and supervising printing, engraving, lecturing, and other departments of the organization. CALIFORNIA'S MAGAZINE is delighted at this opportunity to testify to their kindly and able assistance in its behalf.

The Exposition as an Expression of the Spirit of Co-operation

By R. B. Hale

Vice President of the Panama-Pacific International Exposition

Editor's Note: The spirit of co-operation, so essential to progress, is credited by Mr. Hale as being the underlying factor of the exposition, of which spirit the exposition is, therefore, the expression. Mr. Hale is a business man with wide experience and this fact enables him to include in his view of the great undertaking a practical consideration of its merits and possibilities, not, however, to the exclusion of a thorough appreciation of its spiritual significance and beauty.

THE Panama-Pacific International Exposition is an expression of the spirit of co-operation. It represents the united efforts of many men; the genius of great architects; the scientific planning of able engineers; the careful workmanship of thousands of artisans; the direction of experienced exposition authorities; the financial aid of California's citizenship; the assistance of the states forming our great country; the sympathetic support of people of every clime; the productivity of the world in art, in science and invention. It is a compendium of the world's progress, an encyclopedia of learning, a reflection of the past, an expression of the present, and a promise of the future.

Only one preceding international exposition has made a distinct contribution to exposition architecture in this country. The World's Columbian in Chicago, which introduced the Roman type in plaster, creating the "Great White City," and left its impression upon the people of this nation, as is now evidenced by the Pennsylvania and New York Central

depots in New York, and the Grand Central station in Washington. The Panama-Pacific International Exposition has introduced a number of innovations which promise to change the character of our building in a very marked degree in this country. Not only is the old Roman typified in that matchless colonnade of the Fine Arts Palace, but at least six other periods have contributed to produce the various courts and facades of the main group of palaces, and the architectural effects in the Machinery and Horticultural palaces, Festival Hall, and the South Gardens.

Transforming barren lands and swamps into courts of palms and flowers in the short space of two years, is the work of genius in landscape gardening; the Tower of Jewels, the dominating architectural note by day, a veritable vision of sparkling jeweled beauty by night—the whole ensemble a magic city of brilliancy and perfection, which exalts, but leaves us powerless to describe.

For the first time mural paintings have been used in exterior decorations. Never before has



Night Illumination of Tower of Jewels

such an elaborate and artistic color scheme been attempted, and the wonderfully beautiful effect obtained by the scientific use of indirect lighting has been so sensationally impressive that it has become the wonder and admiration of those world visitors whose stamp of unqualified approval is now spreading its influence around the globe.

The picture has surpassed the dreams of our dreamers. It is world-wide in its significance; it is destined to leave its impress on the people

of all lands. The exhibits will record the history of the arts of peace in a world at war. It is our fervent prayer that the year 1915 may be glorified by celebrating a world at peace, and that war will never again disturb the friendly intercourse and the lasting comity of mankind. Then will the spirit of co-operation and the beneficent influence of brotherly love come into its full fruition, to the everlasting benefit of all people in all lands.

Educational Aspects of the Exposition

By George Hough Perry

Director of Division of Exploitation, Panama-Pacific International Exposition

Editor's Note: A comprehensive survey of the exposition, with an indication of its educational value to the world, is included in this article by Mr. George Hough Perry, director of the division of exploitation of the Panama-Pacific International Exposition. The contribution is not only interesting but highly edifying as well.

THIS great exposition is fundamentally educational in its scope and character. What was before the selection of the exposition site a barren waste of sand dunes, sloughs, and Chinese gardens has become, under the landscape gardener, Mr. John McLaren, and the genial California climate, a veritable Garden of Allah. Experienced gardeners were sent by the exposition to the four corners of the world in search of rare plants, shrubs, and trees. The result is the wonderful transformation of this barren waste into a landscape of unprecedented beauty and charm.

One thousand year old dwarf trees from Japan, millions of tulips and hyacinths from the Philippines and Holland, beautiful eucalyptus, cedar trees and palms may be seen everywhere about the grounds, and give an appearance of permanence and age in no way in keeping with the less than three years it has taken to accomplish the results.

Such is the genius of the landscape engineer and the soil and climate of California.

By a system of plant rotation, the flower beds of the grounds are in constant bloom. As you go along the Avenue of Palms today you will see beds of daffodils, tulips, hya-

cinths, and pansies ablaze with beauty, and the air fragrant with their perfume, while encircling the grounds is a unique wall appearing now as a closely cropped vertical lawn, and at other times aflame with delicate pink flowers. This is the *Mesembryanthemum spectabilis* used at this exposition in this manner for the first time.

Under the great dome of the Horticultural Palace are gathered the rarest flowers, plants, and shrubs of the tropics, growing in all the profusion and vigor that they do in their native land. At night, under the play of colored lights, this palace is a bewitching fairyland of color.

The landscaping effects at the approach to the Palace of Fine Arts, with the walls of green lawns, the beautiful lake, reflecting the wonderful columns of the building itself, impress every visitor as few beauty spots in the world do. Without doubt, the landscaping effects at this exposition surpass anything ever seen at any other exposition.

St. Louis, in a far less hospitable climate, spent \$3000 per acre for landscaping, while California lavished the magnificent sum of \$14,000 per acre for this purpose.

In architecture this exposition is in a class



Western Facade of Palace of Education

of its own. No other exposition has even attempted an approach to it in this respect. The student of architecture would not find in his travel around the world such examples as may be seen here.

The seven great epochs of architecture are here unfolded in historic sequence, from the ancient schools to the very latest types. Egyptian, Grecian, Roman, Moorish, Gothic, French Renaissance, and even the Aztec may all be seen here at their best, in the exhibit palaces, the colonnades, and the courts.

Dr. Gonsaulus, of the Armour Institute of Technology, was so impressed with the educational value of the architecture of this exposition that he said he would select a trip to San Francisco for his classes in architecture in preference to any amount of world travel.

The American Institute of Architecture decided that the best possible exhibit they could make was the architecture of the exposition itself. They will therefore make no other exhibit, but report back to their body the architecture of the exposition.

The exposition does not merely exemplify the world's great schools of architecture, but

the arrangement of the exhibit palaces, their courts, and the general use of these architectural forms, present to the world the highest possible example of all that is best in the history of the art.

A visit to the grounds is an education in architecture of the highest sort.

A STUDY IN COLOR

For the first time in exposition history one great artist has painted the whole exposition city. One beautiful, harmonious color scheme dominates everything within the grounds. Absolute conformity to this color scheme, from the tiniest blade of grass to the flag poles, candy booths, flower beds, lawns, and lights has been insisted upon. This exposition presents a study in color of surpassing beauty. Not since the days of the ancients has there been any such attempt to co-ordinate color, architecture, and statuary.

By having a colored background, colonnades and statuary stand out in all their majestic beauty. It was a daring thing that Jules Guerin conceived and executed, but the results fascinate and delight every visitor.

Secretary McAdoo, when he visited the exposition recently, said that one of the results

of this exposition color scheme would, in his judgment, be the employment of color commissions by the various states.

So great was the impression made upon one of the chief officials of the exposition that in building his country home he said he would not now think of building his residence without working into it a color scheme.

One of the remarkable results of this color scheme, together with the material used in the construction of the exhibit palaces, is to give to everything the appearance of age. This is the most striking feature of the external appearance of all the buildings.

The material out of which all exhibit palaces and all other structures upon the exposition grounds are built is made to imitate the Travertine marble, of which ancient Rome was built. The creamy, slightly broken effect of this material is most restful to the eye.

SCULPTURE

Sixty of America's best sculptors, under the direction of Karl Bitter, produced more than 200 groups and pieces of commanding beauty and interest. One dominant theme has been developed throughout—the conception and completion of the Panama Canal.

Although each man worked along his own lines, and developed his own theme, he did so with one big thought in mind, and the result is a relationship between all of these works which adds tremendously to their significance and attractive force.

Heroic statues of discoverers and conquerors; massive symbolical groups; such as the "Nations of the East" and the "Nations of the West"; beautiful fountains, water-nymphs, and sprites fascinate and hold every visitor to the exposition grounds. One of the distinctive features of this exposition is the amount and character of its sculpture.

MURAL PAINTINGS

Heretofore, mural paintings at expositions have been of a temporary character. Here, however, these are done on canvas, and are permanent. Their life is not limited to the brief period of the exposition, but will be lasting. This has resulted in the very best

efforts on the part of the artists, and a quantity and quality of mural paintings never witnessed at any other exposition.

EXHIBITS

No less remarkable than the exterior decoration of the buildings and grounds is the extent and character of the exhibits.

In the selection of exhibits for this exposition one principle has been adhered to throughout—the selection of those things which would show processes; the securing of such a collection as would present a cross-section, as it were, of the world's activities. The more than 60,000 exhibits, housed in eleven magnificent exhibit palaces, along forty-two miles of exhibit aisles, present a live, working, bustling world in miniature. The field of human achievement has been divided into the following classifications: Live Stock, Agriculture, Horticulture, Mining and Metallurgy, Manufactures, Transportation, Varied Industries, Liberal Arts, Education, Social Economy, Fine Arts.

Nearly every exhibit palace is equipped with moving picture theaters, which greatly facilitate the showing of manufacturing processes, educational methods, scenic attractions, and the life and activities of the world as it is today.

It is impossible to more than suggest the wealth of information, education and enjoyment to be derived from a visit to the exhibit palaces of the Panama-Pacific International Exposition. For example, in the Palace of Food Products may be seen a flour mill in actual operation, turning out and sacking flour. In the same palace may be seen a huge oven, in which the bread of all the nations is baked and distributed by natives in costume on fete days. Here, also, is a pure food laboratory, where the nutritive value of any food may be determined "while you wait." The government has on exhibition a model kitchen, showing what can be done to make the work in the kitchen pleasant, efficient, and healthful. To the baker, the housewife, the teacher of domestic science, and the farmer the exhibits of this palace present a mine of most valuable



Festival Hall, from across South Gardens

information. The farmer will find in his visit to the fifteen-acre Palace of Agriculture every kind of plow, cultivator, harvesting machine, traction engine, windmill—everything that makes for efficiency and convenience on the farm, in working form, with expert demonstrators to inform him upon every question pertaining to them that he can raise.

In connection with these exhibits short lectures are given daily by experts on every phase of agricultural activity.

In the Palace of Horticulture the visitor will find a section of the tropics transplanted, in which may be found every variety of fern, palm, bamboo, cane, shrub, and flower, growing in all the vigor and profusion they do in their native land. Here are royal palms from Cuba, orchids from the Philippines, and almost daily flower shows. Here has been gathered exhibits of every sort of fruit, as well as horticultural implements, and a canning factory in full blast. Here also are seed and orange packing machines, raisin seeding apparatus, spraying machinery, etc. A \$1000 trophy cup has been offered for the finest new seedling rose.

Every lover of domestic animals will find endless pleasure and information in the little world that centers around the sixty-five-acre live stock pavilion. It is the most elaborate, comprehensive, and important live stock exhibit ever seen.

Here will be found twenty-five varieties of prize horses, seventeen varieties of dairy cattle, nineteen varieties of sheep, thirteen varieties of goats, fourteen varieties of swine, 220 varieties of poultry, twenty-five varieties of calves, six varieties of rats, 195 varieties of pigeons, 220 varieties of dogs, thirty varieties of cats, eighteen varieties of hares and rabbits, six varieties of mice. There will be bench shows, fancy stock shows, pure bred stock shows, cat shows, horse shows, poultry shows, horse racing, sledge-huskie contests, etc.

Here will be found the best mile track in America, a live stock arena which seats 6000 people. It will take three miles of silk ribbon to decorate the winners.

The mining engineer, as well as the man who actually with pick and pan coaxes from Mother Nature her golden treasure, will find in the Palace of Mines and Metallurgy samples of the mineral wealth of the world;

processes showing how this wealth is taken from the earth and transformed into useful articles of commerce; a working mine, with a miniature mountain, showing placer, quartz, and coal mining; mining machinery, safety devices, and moving pictures of mining processes and operation.

A house operated throughout entirely by electricity is seen in the Palace of Manufactures.

In the Palace of Transportation one may enter a railway train, and by means of moving pictures, take a trip over an entire railway system. In this palace may also be seen the huge Mallet type of locomotive, a portion of its side removed to show how it is made and operated. Freight cars, trolley cars, steam railways, automobiles, motorcycles, aeroplanes, models of the latest steamships, with a cross section showing how they are made—indeed, the whole story of transportation is here told in working models, moving pictures, and trains.

The famous Roman Baths of Caracalla have been reproduced in the Palace of Machinery. It is the largest building in the world, covering nine acres of ground, and the 250 exhibitors have placed more than 2000 separate exhibits within its spacious enclosure. In this palace may be seen the wonderful Diesel engine, the revolutionary Neuland generator, a model of the Woolworth Building of New York, a submarine engine, workman's safety devices, a printing press actually printing and turning out papers, a most complete government exhibit of every form of activity in her Navy Department, coast defense guns, models of vessels, torpedoes, shells, and a model of the Luzon floating dry dock.

A visit to the Palace of Varied Industries will be a source of much pleasure and profit. Here may be seen silk thread machinery actually making thread; machines weaving silk pillow covers; towels and counterpanes being made by the latest weaving machinery; shoe machinery in full operation.

The Palace of Liberal Arts is full of exhibits of a most interesting character and of

high educational value. In this palace may be seen models of villages, illustrating the home life of various races; theaters and music halls in which the finest music may be heard. One of the most interesting exhibits on the grounds is to be found in the building. It consists of a large lecture room, in which the wonderful development of the Bell Telephone System is explained by lectures and moving pictures, and at the conclusion of the programme the visitor is permitted to listen to a telephone conversation from New York City over the 3400 miles of wire constituting the direct trunk line between New York and San Francisco.

No educational conference has presented such a wealth of information upon every phase of educational activity and social welfare as the Palace of Education and Social Economy presents. In this palace moving pictures show how industrial classes are taught in such great working men's centers as Garey; playground activities, and other forms of recreation.

Here will be found industrial classes of Philippine children, seven years of age, weaving rugs, and a model kindergarten with classes being taught daily; schools for the deaf, dumb, and blind and the sub-normal. Here the government has detailed skilled physicians to make examinations of children and recommend to the parents those things which are necessary for the correction of any physical defects.

The Palace of Fine Arts and its wonderful setting is one of the most striking features of the whole exposition. No less remarkable than the beautiful exterior are the extent and quality of its exhibits. Paintings from the time of West, Copley, and Stuart to the present day are to be found here; canvases from many of the warring nations and their dependencies—harbingers of the peace which it is hoped will soon come—statuary, bronzes, etchings—a museum of art of the most fascinating interest and educational value.

On the "Zone" \$10,000,000 has been spent to furnish entertainment to the exposition visitor. Concessions on the "Zone"—a mile long—do not merely furnish amusement, but



Main Entrance of the California Building, Panama-Pacific International Exposition

they are also distinctly educational in their character. The exposition management has maintained the same care in their selection as in that of the exhibits. Young and old may find on the "Zone" relaxation and entertainment of the very highest kind.

More than half a million dollars has been spent for the musical programme of the exposition. At an enormous expense the Boston Symphony Orchestra has been secured and will cross the continent and give a series of concerts within the exposition grounds. Such musical directors as Max Bendix with his eighty performers; Gabrielle Pares with his orchestra of seventy men; Casassa's band; the organists, Clarence Eddy and Edward Lamare, are

all under contract to give concerts during the exposition.

More than 800 local, national, and international conventions and congresses will take place here during the exposition. They represent every line of organized activity today. No such number of conventions has been obtained for any other exposition.

These are only a few of the striking educational features of the exposition.

A great international exposition has always been regarded as a powerful educational factor, but the Panama-Pacific International Exposition will go down in history as one of the most potent educational influences of the century.

"LIFE is progress—perpetual adaptation to new conditions. The apparent excellence of a result actually attained, the mistakes and errors involved in imperfect efforts to advance to better results, must not be allowed to obscure our view of this truth."—*Arthur T. Hadley.*

Illumination of the Exposition

By W. D'Arcy Ryan

Chief of Illumination at the Panama-Pacific International Exposition

Editor's Note: Mr. Ryan, famous for his work in the illumination of the Hudson-Fulton celebration of the Hudson River, in the lighting of Niagara Falls, and in the lighting of the locks of the Panama Canal, is recognized as one of the world's foremost exponents of the new art in scientific illumination. Under Mr. Ryan's skillful direction the exposition grounds become a magic fairyland at night, glowing with vast numbers of jewels, and every detail of sculpture, of tower, and minaret stands forth in startling brilliancy against the background of the night. Mr. Ryan describes some of the principal features of the lighting of the exposition in the following article.

THE illumination of the Panama-Pacific International Exposition marks an epoch in the science of lighting and the art of illumination. Like many other features of the exposition the illumination is highly educational in character and emphasizes, more than anything that has gone before, the result of concentrated study in the best uses and application of artificial lights.

Previous exposition buildings have, in the main, been used as backgrounds upon which to display lamps. The art of outlining notably the effects obtained at the Pan-American Exposition at Buffalo could probably not be surpassed. This method of illumination, however, has been extended to amusement parks throughout the world and is now commonplace. Its particular disadvantage is the fact that it is practically impossible to obtain a variety of effects so that the exposition from every point of view presents more or less similarity. Furthermore, the glare from so many

exposed sources, particularly when assembled on white buildings, causes severe retinal fatigue. There are some who still maintain that the public will not be attracted except by glare of exposed sources and great brilliancy. This is analogous to saying that the masses can be attracted only by one form of lighting and the Panama-Pacific International Exposition overwhelmingly disproves this theory.

The lighting effects are radical, daring, and in every sense new, the fundamental features consisting primarily of masked light upon softly illuminated facades, emphasized by strongly illuminated towers and minarets in beautiful colored tones. The direct source is completely screened in the main vistas. At all other points the screening is at a maximum. The "behind the scenes" effects are minimized to few locations and direct sources are permitted only at points of emphasis such as gates, where for utilitarian purposes and also to act as markers, exposed sources of rela-

tively high intrinsic brilliancy are absolutely necessary.

WONDERFUL CONTRASTS

Furnishing wonderful contrasts to the soft illumination of the palaces with their high lights and shadows there is "The Zone" or amusement section, with all the glare of the bizarre, giving the visitor an opportunity to contrast the light of the present with the illumination of the future.

Passing from The Zone with its blaze of lights, one enters a pleasing field of mystery. The visitor is at first impressed by the beautiful colors of the heraldic shields in which are written the early history of the Pacific Ocean and California. Looking from the semi-shadows upon beautiful facades, the Guerin colors which fascinate in the day time are even more entrancing by night. The lawns and shrubbery surrounding the buildings and the trees with their wonderful shadows appear in magnificent relief against the soft background of the palaces, and the Tower of Jewels, standing mysteriously against the starry blue-black canopy, surpasses the fairy dreams of Aladdin.

Entering the Court of Abundance from the east, with its masked shell standards strongly illuminating the cornice lines and gradually fading to twilight in the foreground, a sensation of mystery analogous to the prime conception of the architect's wonderful creation is felt. Soft radiant energy is everywhere. Lights and shadows abound. Fire spits from the mouths of serpents and sends its flickering rays over the composite Spanish-Gothic-Oriental grandeur. Mysterious vapors rise from caldrons and the beautiful central group symbolizing the earth in formation.

Passing through a Venetian court the visitor emerges into the Court of the Universe where the illumination reaches its climax in dignity, thoroughly in keeping with the grandeur of the court where an area of approximately 450,000 square feet is illuminated by two fountains rising ninety-five feet. The primary source installed in these fountains gives a combined spherical candle power of about 500,000, and yet the intrinsic brilliancy is relatively so

low that these great sources are free from disagreeable glare.

PEACE SUGGESTED

Passing through a second Venetian court to the west, the classical grand Court of Four Seasons is discovered. This field of illumination is in perfect harmony with the surroundings, suggesting peace and quiet. The columns stand out in semi-silhouette against the warmly illuminated niches with their cascades of falling water. The placid central pool reflects, in marvelous beauty, scenes of enchantment.

Having reviewed in order illuminations mysterious, grand, and peaceful, the spectator emerges from the West Court upon lighting classical and sublime, the magnificent Palace of Fine Arts bathed in triple moonlight and casting reflections in the lagoon impossible to describe.

Thus far the visitor has only passed through the central, east, and west axes of the exposition. There are many more marvels in illumination to be seen. If one wished to study the art of illumination he could visit the exposition every evening throughout the year and still find detail studies of interest.

For instance, artificial illumination in competition with daylight is a feature worth one's attention. Two or three nights a week the searchlights are turned upon the towers as the sun goes down. If the spectator would view this from a vantage point he should take up a position in the northwest section of the Court of the Universe and watch the marvelous effect of the Tower of Jewels as the daylight vanishes and the artificial illumination rises above the deepening shadows of the night. The prismatic colors of the jewels intensify and the tower itself becomes a vision of beauty never to be forgotten. With the approaching darkness the mosquito fleet of searchlights sends forth 200 tiny rays bringing the seraphic or star figures surrounding the Court of Honor out of darkness and the jeweled heads send forth all the pure colors of nature, from the palest violet to the deepest red. Without revealing a trace of the origin of the source,

the Pompeian red walls surmounted by a cerulean blue canopy studded with golden stars spring into existence revealing in silhouette a colonnade magnificent.

Another master switch closes and the two great fountains in the Sunken Gardens shed their radiance over the scene, completing the most wonderful night picture ever beheld, the illumination of the Court of the Universe of the Panama-Pacific International Exposition.

AN ENCHANTING VIEW

Another evening one may stand at the main entrance of the tropical or South Gardens. As the first switch is closed, soft radiant sources spring into existence in the line of vision revealing the palms and tropical foliage in silhouette. As if by magic the towers, minarets, and pylon-lanterns of the exposition become visible, bathed in ruby tones appearing with the iridescence of red hot metal, gradually fading to delicate pink in the flood of more than 100 searchlights which convert the exterior of the towers into soft Italian marble. Another switch is closed and the flags surrounding the parapet walls burst into flames. In rapid succession the facades spring out of the darkness as the banner standards cast fairy-like radiance over the scene, which is enhanced by the colors of the heraldic shields. This transition is rapidly followed by a burst of orange and red lights from the windows of the exposition, including the clerestories, domes, and minarets, giving the exposition the effect of life within and thereby adding joy and happiness to the picture.

Glancing to the west one beholds the enormous dome of the Palace of Horticulture converted into an astronomical sphere with its revolving spots, rings, and comets appearing and disappearing above and below the horizon, vanishing and reappearing in the field of vision and changing colors as they swing through their orbits. The action is not mechanical, but purely astronomical, suggesting the formation of the universe, the "Nebular Hypothesis."

If an entire evening were devoted to watch-

ing this dome similar effects would be noticed, but an exact duplicate of color, formation, and position would probably never appear.

If one has caught the inspiration from the sublime and beautiful in illumination, another evening will be spent in enjoyment of the refined spectacular features of the art. It is merely necessary to take up a position anywhere on the "Marina" or North Gardens and wait for the signal gun. Over 2,600,000,000 projected candle power will simultaneously burst forth from the great scintillator located on the miniature Morro Castle at the entrance of the Yacht Harbor, forming an Aurora Borealis which reaches from the Golden Gate to Sausalito and extends for miles in every direction. Wonderful Scotch plaids appear in the sky and one is sure to be impressed by the wierd "Ghost Dance" or the "Spook's Parade" of the beams.

The north facades of the exposition are illuminated in ever-changing colors. Alcatraz and the Marin hills come in for their share of attention.

Fireless fireworks, mammoth steam effects, some rising to a height of over 100 feet, including the "Devil's Fan," "Plume of Paradise," "Fairy Feathers," "Sunburst," and "Chromatic Wheels" are novel features. Explosions of mines produce great banks of smoke giving forth radiations of every known tint and shade. Sunset clouds burst forth in the night, strange and grotesque figures move across the sky illuminated by the concentrated rays of the searchlights.

Flags of all nations float through the air. Artillery thunders, driving belching smoke into the blaze of artificial glory. Steam serpents spit and hiss as they execute fantastic gyrations.

A modern 200-ton express locomotive with eighty-one-inch driving wheels is shown speeding at a mile a minute on water brakes, the smoke and steam producing one of the most gorgeous and impressive spectacles in color ever created.

From time to time during the year special features will be announced. On certain nights

lights are turned on before dark to produce the effects previously mentioned and on other evenings do not appear until after darkness.

The scintillator programme is also subject to considerable variation, as there are over 300 effects worked out, which it would be impossible to produce in a single evening.

ATMOSPHERIC CONDITIONS

Atmospheric conditions have great influence upon the effects; for instance, on still nights the water reflections in the lagoons deserve study; particularly the Palace of Fine Arts as viewed from Administration Avenue, the facades of Education and Food Products palaces through the colonnade of the Palace of Fine Arts; the palaces of Horticulture and

Festival Hall from their respective lagoons in the South Gardens; the colonnades and "Novagems" on the heads of the seraphic figures and Tower of Jewels, as seen in the water mirror in the north arm of the Court of the Universe.

On windy nights the flags are at their best; on foggy nights wonderful glows are produced over the exposition impossible at other times. When the wind is blowing over the land, the scintillator display is different from nights when the wind is blowing across the bay, and a further variety is introduced in the action of the smoke and steam on calm nights. The exposition visitors therefore have at their disposal an ever-changing spectacle.

California in 1915

By THE LATE ELBERT HUBBARD (From "The Fra")

"THIS IS A GENUINE NEW YEAR. It is the newest New Year that the world has ever seen. Americans are at peace with one another as we never have been before.

"We have gotten rid of many of our whims, prejudices, superstitions.

"In degree we have eliminated hate and fear and doubt, and the truth stands out limned against the sky.

"Happily, this is the year of two great expositions, both held in California.

"The time could not have been more fortunate—aye, nor the localities. For once our attention is taken from the East and is directed to the West.

"The tide of travel which has usually set toward Europe will be directed to California. The poetry, the science, the oratory, the literature, and the reason of the world will be assembled there. And as Eighteen Hundred Seventy-Six was a pivotal point in the career of America, so will be Nineteen Hundred Fifteen. This year for us is big with promise—a promise which will find fulfillment in a larger manhood.

"It is a wonderful time in which to live."

Sculpture

By A. Sterling Calder

Acting Chief of Sculpture at Panama-Pacific International Exposition

The sculpture at the Exposition is undoubtedly the finest showing of works of contemporary sculptures that has been executed anywhere in the world in recent years. Mr. Calder is not only one of the foremost sculptors of the day, but he has taken upon himself a great executive work and performed it with an ability as an executive that is only equaled by his genius as a sculptor. Among Mr. Calder's finest productions are the great Fountain of Energy in the South Gardens. With Messrs. Frederick G. R. Roth and Leo Lentelli, Mr. Calder collaborated in the two famous groups, the Nations of the East and the Nations of the West, crowning the arches of the Rising and the Setting Sun in the Court of the Universe.

THE sculpture of the Panama-Pacific International Exposition expresses the note of the exposition in its celebration of the completion of the Panama Canal, a task that culminated the effort of centuries to get a passageway from the Atlantic to the Pacific Ocean. It is the sculpture that interprets the meaning of the exposition, that symbolizes the spirit of conquest and of adventure, and lends imagery to all the elements that have resulted in the union of the Eastern and Western seas. Divest the exposition of its sculpture and you would have no visible symbols to characterize or interpret its purpose and its accomplishment.

At the exposition today there is given very remarkable evidence of the spirit of the American sculpture of the present time. It reveals the ideals of the sculptors and what they stand for in American art. The works are remarkable for their originality and qualities of design.

Of those who contributed the product of their creative talent to the full display mention is deserved by Messrs. Albert Jaegers, Furio Piccirilli, Evelyn Beatrice Long-

man, Messrs. H. A. MacNeil, A. H. Weinman, Robert Aitken, Paul Manship, D. C. French, F. G. R. Roth, Leo Lentelli, John Flanagan, Mrs. Edith Woodman Burroughs, Mrs. Harry Payne Whitney, Messrs. Isidore Konti, Haig Patigian, Sherry Fry, Chester Beach, Albert Weinert, Ulric Ellerhusen, B. L. Zimm, Douglas Tilden, Herbert Adams, Allen Newman, Charles R. Harley, Ralph Stackpole, Mahonri Young, James Earle Fraser, G. Gurlach, L. Borghum, C. C. Ramsey, Albert Laessle, Edgar Walter, John Bateman, and Kark Gruppe. Mr. Karl Bitter, chief of the department, is not represented by personal work, but his intelligence and experience in former enterprises made the successful accomplishment of this possible.

To an extraordinary degree this exposition shows the growing intimacy between sculpture and architecture, and, in its completeness, stands as a monumental example of the resultant beauty in total effects due to this happier union of the arts for the fulfillment of a mutual ultimate purpose.

From the beginning the general architectural scheme to be carried out by the struc-



Arch of the Rising Sun, Across Court of the Universe

tural exterior of this exposition was that of a cohesive series of Oriental palaces; in reality, a group of buildings and gardens, yet conveying a sense of one structure in design and effect. It is in connection with this group of buildings that sculpture has been principally applied at this exposition, and just as these buildings are unique in their escape from isolation, so is the sculpture unique in the cohesive design which it governs as a whole. The general plan of the sculpture has been to form a sequence from the first piece that greets the visitor on his entrance from the city on the south throughout the five courts and the circuit of the enclosing walls. Here then the exposition presents sculpture of a closely applied architectural kind decorating the great arches, towers, and facades, supplementing the free standing monuments, fountains, groups, and statues. The sculptor has sympathetically composed his statues, spandrels, medallions, and friezes with the supporting structures of the architect, and the combined work is stamped with character, beauty, and thought.

Never before, perhaps, have sculptors anywhere, since sculpture and architecture worked hand in hand, so completely played their most important rôles in the ensemble setting that constitutes the Panama-Pacific International Exposition visually. On arches and columns, in niches, fountains, and free standing groups they sing of many themes and always in harmony, but with no loss of character or individuality.

CONTRASTING EXAMPLES

Consider, for example, the contrast in conception and modeling in the work of such masters as Isidore Konti, who designed the high relief encircling the pedestal of the "Column of Progress"—a very serious work, and Mrs. Burroughs with her naive conception of the "Fountain of Youth," the charming formalization of Manship's groups in the Court of the Universe, the swinging bravura of Aitken's Elements in the same location, the broad classic treatment of Zimm's and Ellerhusen's work on the Palace of Fine Arts, the poetic naturalism of Fraser's "End of the

Trail" and Borglum's "Pioneer," and the statuesque vigor and well observed horsemanship of Rumsye's "Pizarro" and Niehaus's "Cortez," the gracious supple loveliness of Frye's girls on Festival Hall, Lentelli's facile renderings of architectural themes, Weinert's charmingly quaint finials, Mahonri Young's and Stackpole's sturdy naturalism and Harley's richly designed archaeological groups teeming with Piranesi reminiscence—MacNeil's fine group of the "Adventurous Archer," capping the "Column of Progress," Beach's colorful compositions for the tower of the Court of Ages, Jaeger's dignified groups in the Court of Seasons, Piccirilli's thoughtful niche fountains in the same court, and Miss Evelyn B. Longman's classic fountain of Ceres.

SYMBOLISM IN MOTIFS

The heart of the symbolic significance of the sculpture is centered in the motifs that have been treated in the central axis of the plan of the exposition from south to north, from the main Scott Street entrance to the bay. Here the "Fountain of Energy," a joyous aquatic triumph celebrating the completion of the Panama Canal, first greets the visitor in the center of the South Gardens. Passing this, on each side of the great archway of the tower, are stationed the equestrian statues of "Pizarro" and "Cortez." Within the colonnade at each end, west and east, are the mural fountains of "Youth" and "El Dorado." Arriving within the Court of the Universe, which is the one best place to obtain a general conception of the scope of the sculpture, we realize that here, enclosed by the sweeping star-capped colonnade, is the arena of universal themes. The titanic elements slumber on the terrace wall, while the lighter themes of music and dance decorate positions in front of the triumphal arches of the "Rising Sun" and the "Setting Sun." Richly laden with delicate relief sculpture of great beauty, these form magnificent piles crowned by the distinguished groups of the "Nations of the East" and the "Nations of the West," here brought face to face. Before them, in the sunken

gardens, the handsome architectural fountains of the two "suns" play.

At the north entrance to the court stands a colossal sentinel—the "Column of Progress" symbolizing progressive human effort, balanced at the end of the south vista by the "Fountain of Energy" joyously proclaiming the triumph of the moment—the achievement of the Panama Canal.

The "Column of Progress" is the first great column in the world whose design was inspired by a purely imaginative motif, and the first sculptured column erected at any exposition. "The unconquerable impulse that forever impels man to strive onward, assailing in endless generations, the impeding barriers of ignorance, his eternal optimism and stern joy in effort"; these are the thoughts that have inspired the conception of the "Column of Progress" and that are embodied in its sculptured friezes and crowning group. The column itself is a symbol of achievement, and the procession of figures forming the frieze of the pedestal embodies, in high relief sculpture, the successive generations born teeming from the earth, irresistibly pressing onward, seeking by devious ways the golden dreams of life. This is the work of Isidore Konti.

TARGET OF TRUTH

Above the capital of the column, crouching figures of toilers form the circular frieze, which in turn supports the crowning group, representing the supreme moment of man's prime. This group, as well as the frieze of the toilers, is the work of Herman A. MacNeil. It is composed of three figures: A kneeling woman in fearful expectation, eager to applaud success; a guarding male supporting the central figure of the "Man of Purpose," who launches his shaft to the obscure target of "Truth," unseen but to himself and those of his kin, who, yet to come, shall speed the world to progress.

Crowning the arch of the "Rising Sun" is the monumental group—the "Nations of the East." This group is one of colossal size and is sumptuous in its number of Oriental figures including mounted horsemen, camels, a huge

elephant as the central figure, an Arab warrior, a negro servitor, bearing baskets of fruit, an Egyptian falconer, the Buddhist lama bearing the emblem of authority, Mohammedan camel riders, and the spirit of the East, attended by Oriental mystics representing India. Inscribed beneath the arch are the following lines from "The Light of Asia," epitomizing the spirit of the East: "Unto Nirvana, He is one with Life, yet lives not—He is blest ceasing to be—Om Mani Padmi om—The Dewdrop slips into the Shining Sea."

Similarly the "Arch of the Setting Sun" is surmounted by a group representing the "Nations of the West." Like the group described above, this work is characterized as both vital and imaginative, and is conceived in the same large monumental style. The types of those colonizing nations which have some time in history left their permanent imprint on our country have been selected to form it. In the group are the "Mother of Tomorrow," "Enterprise," and the "Hopes of the Future," and horsemen, pedestrians, and oxen drawing a huge prairie wagon. The following lines from Emerson's "The Young American" have been inscribed on the arch beneath this group: "There is a sublime and friendly destiny by which the human race is guided—the race

never dying—the individual never spared—to results affecting masses and ages."

Like music, sculpture embodies a mood. This is delightfully apparent in the twelve fountains which constitute an interesting group of widely different conception designed for as different conditions and positions. The "Fountain of Energy" may be characterized as joyous in mood; the "Fountain of Life"—dramatic; the "Fountain of the Rising Sun" and the "Fountain of the Setting Sun"—architectonic; the "Fountain of Youth"—naive; the "Fountain of El Dorado"—literal; the "Fountain of Ceres"—classic; the four "Fountains of the Seasons"—pastoral; the "Fountain of Beauty and the Beast"—playful.

Sculpture is the most important of all arts to an exposition, because it is the most human. Architecture without it would be cold and without appeal; color have no lovely shapes on which to rest. It is the essence of form, the crown to architecture, the "Song to the Eye."

I foresee a great future for sculpture in America, where our temperament demands it. The educational value of this display is incalculable. It is at once a school for sculpture and for the public. In a word, our sculpture is a triumph of unified conception and execution in imaginative and inventive originality.



Texture of Buildings at the Exposition

By George W. Kelham

Chief of Architecture, Panama-Pacific International Exposition

Editor's Note: The difficulties of obtaining just the proper texture of material for the exposition buildings, the right shades of coloring, and the necessary durability are told by Mr. Kelham in this interesting paper. As is widely known, the architecture of the exposition is a result of the co-operative work of a number of the most famous architects in America and the result has been all that even the most sanguine could have anticipated. Mr. Kelham's article is a valuable record of the accomplishment.

IN THE science of exposition engineering, now recognized as being as distinct a branch of engineering as railroad, structural, or electrical, many perplexing problems arise that are little dreamed of by the layman. Matters that may seem to be mere details of comparatively little importance turn out to be things of vital moment.

One of these problems appeared early in the preparation for the Panama-Pacific International Exposition, to be held in San Francisco in 1915. It was the question of the texture of the outer walls, or covering, of the great exhibit palaces. The way the problem was solved makes an interesting and instructive story.

At the end of a long day's work, in fact of several such days, a group of architects gathered around a table in San Francisco. Nearly all the preliminary architectural work of the Panama-Pacific International Exposition had been gone over, threshed out, criticism freely offered and as freely accepted, and these men were sitting back with the feeling of a good day's work done and with a well defined in-

tention of doing no more. I remember going over in my mind whether I had better say what I wanted to then, or let it go over until the next day and then, remembering that one, if not two, of our most important members were to leave that night, I brought out the subject of my thoughts.

What about texture? A very innocent question in itself, and one that to the lay mind means nothing. But this, I believe, was the beginning of the most important single achievement of this exposition of 1915. What about texture? There is nothing in the whole range of architecture and building more important and at the same time more illusive; nothing that produces greater charm, without which and its inevitable close relationship to color, no great architectural effect has been produced.

Now, it is perhaps a far cry from the really great terminal of the Pennsylvania railroad in New York, all the way to San Francisco Bay and this exposition. Nevertheless the trail is perfectly clear and when the discussion of this question of texture had got well under



way, it was Mr. Richardson, of the firm of McKim, Mead & White, who suggested:

"Why not have Mr. Paul E. Dennivelle come out and see what he can do?" It was this same Dennivelle who had schemed a way to produce the very beautiful imitation stone used in the large waiting room of the Pennsylvania station in New York, which is simply a faithful reproduction of Roman Travertine rock. A telegram was sent to him that night.

On his arrival in San Francisco, after consultation with the different architects interested, and with Jules Guerin, chief of color of the exposition, we decided to attempt to make the entire exterior of the exposition buildings and courts as nearly like Travertine rock as the conditions would permit, and, most important of all, to get what color we used into the material itself and so avoid entirely the use of paint.

This was the beginning of a long series of experiments and disappointments, but it re-

sulted in overcoming difficulties which at times seemed insurmountable and produced a material which not only gives a delightful texture and surface, but also does away with the disagreeable glare always found in buildings of white stucco, and doubly unpleasant in a climate with the intense sunlight of California.

To a person interested at all in material of this kind, it may be worth while to hear a little of the troubles we encountered. First we were confronted with the question of cost, next with the appearance of the surface and then with the necessity for using a material that would be sufficiently durable to last through the period of the exposition; in some buildings more than two years.

For a long time it looked as if the whole affair would end at the first problem. It did not seem possible to produce such a surface as we wanted at approximately the same price as ordinary plaster, and right here was where Mr. Dennivelle proved himself.

Of course, he had to make the scale of the stone texture much greater for the exteriors than would be the case in actual Travertine and in order to do this he used every sort of tool, from an ordinary plastering trowel to a whisk broom.

First, all kinds of markings were made in the plaster to give it the lines and pit marks of the stone, and then, just before it set, a trowel was passed lightly over the surface, bringing it to a wonderfully close imitation.

All this at first cost a good deal more than could be afforded, but by changes in methods, suggestions to the workmen, and constant experiment, Dennivelle succeeded in arriving at a satisfactory cost basis and we were over hurdle number one.

The next step was to get the right color value and to keep it reasonably uniform. This sounds simple enough, and it would be for work of ordinary size, but when it is realized that our problem involved buildings covering acres in extent, designed in all parts of the

world and built by nobody knew how many different contractors, it becomes evident that any scheme by which each contractor should try and make his work like the others would result in chaos.

We were told it was not practicable; that we would never be able to hold the different men in line and that we would have as many different color effects as there were buildings. For a time it looked as if this were true, for plaster, sand, and coloring matter must necessarily be the same in each piece of work.

Nobody but the director of works of the exposition knows how many schemes were examined to solve this problem. The final solution was simple enough, but after what a struggle! It was this:

We got the plaster mills to agree to furnish all the material to be used with the color already mixed as it came from the mill, so that every plasterer perforce had the same color, and the exposition company furnished all sand of a uniform color. Thus we suc-



Section of the Palace of Fine Arts



ceeded in disposing of problem number two. The third problem did not offer any great difficulty. A coat of lime plaster was put on the wood lath, followed by a finished coat of "hard-wall," with some additional mixture in the latter, giving a very hard surface, far more durable than the ordinary stucco finish. It took a long time to arrive at the right color value to satisfy the color sense of Mr. Guerin, but with that accomplished our troubles were over and a long step had been taken in exposition work.

It is difficult indeed to describe the effect of the material we had produced. It is like stone and at the same time it is not like it. All the expositions of the past either have been whitened or paint has been used on the exterior surfaces, and there can be little difference of opinion in regard to the lack of satisfaction with both methods. We who have been connected with this work felt from the beginning that some means had to be found to improve on past conditions; just what, we did not know, but our faith in the possibility never wavered, and that it was well justified I believe will be the opinion of every visitor to

the exposition in 1915. Many visitors may not realize or appreciate the effort that has been made along these lines, but each and every one will realize that the effect is harmonious and agreeable, that there is a general color tone that glows with the softness of a piece of antique marble, and that the mural paintings and flat colors are an actual part of the walls and not, as so often has been the case, an individual spot.

This idea has been carried into everything. The roofs, the flags, even the planting, are made to take proper place in the color scheme adopted, the backbone of which is our Travertine rock, imitation, if you will, but Travertine just the same, a stone to which nature has given the loveliest of colors.

To produce this general effect of one great color scheme has been the constant effort of those having it in charge, and it is their belief that the result measures up to what had been hoped for. Thus the exposition celebration of the completion of the Panama Canal proves that, even in this day and this generation, different arts can and have been made to work in real harmony.

Liberal Arts

By Theodore Hardee

Chief of Liberal Arts, Panama-Pacific International Exposition

Editor's Note: Mr. Hardee tells of the many wonderful exhibits that may be seen in the giant Palace of Liberal Arts and also in that portion of the Palace of Machinery which is devoted to machines given to the manufacture of the products of the graphic arts. Through the liberal arts man has attained his present stage of cultivation, and Mr. Hardee's article is an exposition of the displays in his department.

LIBERAL ARTS rank high in the exposition's classification of exhibits, embracing, as they do, the applied sciences which indicate the result of man's education and culture, illustrate his tastes, demonstrate his inventive genius and scientific attainment and express his artistic nature. Thus they include electrical methods of communication, musical instruments, theatrical appliances and equipment, instruments of precision, medicine and surgery, chemistry and pharmacy, photography, civil engineering, typography and publications, architecture, map and model making—in brief, nearly everything pertaining to the higher branches of human progress. The fact that the world-total of exports of the products of liberal arts is about 8 per cent of all export trade is indicative of the importance played by the liberal arts in the industrial world.

The liberal arts display presented in the Panama-Pacific International Exposition consists of interesting processes and products representative of the highest types in all parts of the world. The six-acre floor area of the Palace of Liberal Arts and 30,000 square feet of floor space in the Palace of Machinery, for some of the heavier exhibits, are devoted to their exhibition. The exhibits from the United States are classified in industrial groups, while

foreign displays are grouped in accordance with nationality. Everything is entered in competition by the international jury on awards.

GOVERNMENTAL EXHIBIT

The most extensive exhibit in this department of the exposition is the display entered by the United States government, occupying 66,000 square feet and inclusive enough to illustrate comprehensively the workings of the governmental machinery of the greatest republic on earth. Included are a miniature model of the Capitol at Washington, D. C., and displays from the printing office, the isthmian canal commission, the reclamation service, the bureau of standards, the Smithsonian Institute, the National Red Cross Society, the civil service commission, the supervising architect's office, the census bureau, the educational and medical bureaus of the War and Navy departments, the Library of Congress, the labor bureau, the Indian office, the bureau of parks and reservations, the public health service, and other important agencies of the government.

The great strides made in the development of wireless telegraphy, as well as the still later efforts in the development of wireless telephony, since the last great international exposition, are exhaustively demonstrated here among other American exhibits.



In a booth erected at a cost of over \$30,000 the American Telephone and Telegraph Company has prepared a remarkable display. The exterior of the booth is at once unique, beautiful and patriotic, being a huge curved map of the United States, showing the development of telephone and telegraph service. The map is illuminated from the back and the principal rivers, lakes, mountains, valleys, plains and cities are picked out with jeweled lights. Behind it are several enclosures, one of them a theatre for moving pictures and practical demonstrations of long distance telephony by which the audience is able to hear speech from distant points. Other services of wire and cable are also practically demonstrated in this structure and there are displays of historical significance showing the development of early forms of instruments into modern appliances.

The General Acoustic Company's exhibit of dictagraphs and instruments employed in the "Turner system" of inter-office communication demonstrates how business transaction is expedited through this remarkable invention, and how the little instruments are adapted to the detection of crime.

Here, also, occupying 600 square feet, is shown the De Forest Radio Telephone and Telegraph system, a simple looking apparatus by which wireless telephony is conducted. By means of this wonderful system the exposition management intends keeping constantly in touch with the great fleet of warships composing the international naval pageant while en route to San Francisco from Hampton Roads via the Panama Canal this spring, with President Wilson at its head.

A "working exhibit," installed by the Star Electric Company, in conjunction with the Aero Fire Alarm Company, consists of a central fire alarm station for the 102 boxes scattered throughout the exposition grounds and buildings. These boxes are absolutely non-interfering and successive, so that nine alarms may be sounded simultaneously and all register in rapid succession—just three times the number that could be so registered with surety before the advent of this type of box. The central station equipment includes a twelve-circuit switchboard, an eight-circuit automatic repeater, four local engine house circuits, a signal wheel for transmitting still and special

alarms, a punching register and an automatic time stamp that is controlled by a self-winding electric clock. - In the same booth is located the exposition's central police station, with facilities for telephonic communication with the headquarters of the military guards. Here also the Star Electric Company exhibits its various styles of apparatus.

In a magnificent booth, covering 2000 square feet, the Western Union Telegraph Company demonstrates for the visiting world's instruction how its system is operated. Mural illustrations show such particulars of its mysteries as could not be demonstrated comprehensively in more practical form. How messages are relayed around the world is one of the matters made clear to the "uninitiated" by this exhibit.

There are also many other interesting exhibits in the group devoted to electrical methods of communication.

The wonderful exhibit in the field of harmonics runs practically the whole gamut of musical instruments from the latest in great pipe organs to the lesser instruments of more common usage. Where processes of manufacture can conveniently be shown they are utilized, especially in the ingenious devices for automatically reproducing vocal and instrumental music, including phonographs, graphophones and talking machines, self-playing orchestrons, electric pianos and other mechanically operated musical instruments.

GREAT PIPE ORGAN

Installed as a working exhibit in Festival Hall is a \$50,000 pipe organ which was built by the Austin Organ Company at Hartford, Conn., in accordance with plans drawn by a committee of the American Guild of Organists. It is 71 feet high, 40 feet wide and 20 feet deep, with 113 speaking stops, five key-boards and an auxiliary echo organ in the crystal dome of the building. For its operation a 35 horse-power electric motor is required and, during the exposition, it will be played by the most celebrated organists available, among them Mr. Edwin H. Lemaire of London, who has been engaged to give more than one hundred recitals. At the close of the

exposition this magnificent instrument will be presented by the exposition management to the municipality of San Francisco and placed in the million dollar auditorium which is an adjunct of the exposition proper. In this organ's construction all "freak" attachments have been omitted, the purpose of its designers being to maintain the sentiment of grandeur and nobleness which essentially pertains to such an instrument.

A feature of the Victor Talking Machine Company's extensive exhibit is a demonstration of the Victrola's utility as a teacher of singing. Considerable floor space is given over to the display of the Columbia Graphophone Company, a detail of which is a demonstration of how records are made.

INSTRUMENTS OF PRECISION

Most prominent among the exhibits of "instruments of precision" and symbolizing the applied sciences represented by the liberal arts is the great telescope which stands under the dome, weighs ten tons, measures forty feet long, has a 20-inch lens and was made expressly for the Chabot Observatory at Oakland, Cal., by the Warner & Swasey Co., makers of the famous Lick and Yerkes telescopes. When directed at its zenith the object glass of this telescope is thirty-eight feet above the floor. All of its optical parts, including the lens, are the product of the John A. Brashear Company. As its magnifying power ranges from 100 to 1000 diameters, its size is not exceeded by more than three telescopes on earth.

The National Cash Register Company, in an exhibit covering 2600 square feet, shows cash registers of its manufacture in all established shapes and sizes, together with processes of their making either demonstrated or depicted. For the latter purpose a motion picture theatre is utilized.

There are also numerous displays of adding and calculating machines, among the principal exhibitors being the Burroughs, the Dalton, the New Standard, the Felt and Tarrant and the Marchant. Gate registers are shown by the Coin Machine Manufacturing Company.

The Toledo Scale Company takes up 1000 square feet and similar space is occupied by the Keuffel & Esser Co.'s display of laboratory apparatus, nautical, surveying and other delicate instruments. Comprehensive optical exhibits are placed by the Bausch & Lomb Co. and the A. Lietz Company.

Related to the exhibits classified as "medicine and surgery" is the Exposition Hospital, a "working exhibit" established under the auspices of the United States Health Service. Its equipment is largely furnished by various exhibitors and it is maintained for first aid treatment of bodily injuries received by persons within the exposition enclosure. It is fully equipped with all necessary appliances, and has a library of the most up-to-date medical and surgical literature, as well as a corps of competent doctors and surgeons. Its X-ray apparatus is pronounced the finest and most complete ever manufactured.

Johnson & Johnson have an extensive display of dressings. The Chicago Company has an exhibit of artificial limbs, and other exhibitors in this group are the Carnes Company, the Chicago Company, the Aunger Company, and A. A. Marks. Similarly the Columbus Dental Company, the Harvard Company, and the Dentists' Supply Company have interesting exhibits in their line.

Chemistry and pharmacy are extensively represented. The group covering twenty-four classes—all of vast interest even to the layman. The Radium Therapy Corporation of New York has an exhibit showing the utility of radium as a healer, and also a demonstration of the process of preparing radio-active water at home.

Other attractive exhibits are of perfumes by Paul Rieger & Co. of San Francisco and the California Perfume Company of New York; dentifrices by the Sanitol Company; alkalis by the Solvey Process Company; face creams and lotions by the Laughlin Fruit Refining Company, Walter H. Willet and Channell Chemical Company; biological products by the Cutter Laboratory and various products by the Western Carbonic Gas Company, the

Ohio Chemical and Manufacturing Company, the West Disinfecting Company, the Emerson Drug Company, and the American Druggists' Syndicate.

Photography, in the particulars of its equipment, processes and products is exhibited in the Palace of Liberal Arts. The Eastman Kodak Company and the Ansco Company each shows how its cameras are made and how its cameras make pictures. Moving picture machinery is displayed by the Nichols Power Company, and the Vanoscope demonstrates how "movies" may be operated in the home. Specimens of fine portraiture are contributed by the Sprague-Hathaway Company and by Kathryn Hopkins, and scenic and commercial views by Mr. H. C. Tibbitts. A pictorial booth especially devoted to artistic photography shows a splendid collection of about five hundred carefully selected pictures of the highest merit. Photographers' and cinematographic supplies are shown by the Simplex Photo Products Company.

In the field of graphic arts, printing and bookmaking are practically demonstrated on a large scale. The San Francisco *Chronicle* shows how a metropolitan daily is turned out, and the Hearst publications, in the Palace of Machinery, have a continuous demonstration of the latest Hoe press, printing three sections of a Sunday newspaper at one time. Other exhibitors in this group are numerous, covering presses and other machinery, typewriters, engraving equipment, bookbinding machinery, books and publishers' displays.

A working model of the New York State barge canal system covers 2000 feet in the space allotted to civil engineering, showing how its \$150,000,000 network of waterways is operated. Road building is demonstrated by the highly interesting displays made by the Austin Western Road Machinery Company and the Graves-Spears Road Machinery Company, which includes exhibits from the Ohio Road Machinery Company, the Buffalo Steam Roller, Power and Mining Machinery Company, and the Smith and Sons Manufacturing Company.

The architectural group shows a 20-foot high model of the new Woolworth Building in New York city—the tallest building in the world.

Among the "working exhibits" elsewhere on the exposition grounds, in addition to those already mentioned, are the garbage and refuse disposal plant; a reproduction of the Panama Canal, which is a big feature in the Zone (this exposition's street of carnival fun); the opera chairs in Festival Hall, and the Remington typewriters and Columbia dictaphones used exclusively in all the offices of the exposition management.

Twelve hundred square feet of the Palace of Liberal Arts contain a display of theatre chairs by the Wisconsin Seating Company.

The American Map Makers' Company has 800 square feet covered by its exhibit, and B. J. S. Cahill's modern map of the "earth cut in two" is also on exhibition.

In the foreign section of the Palace of Liberal Arts elaborate exhibits touching the numerous branches of the liberal arts are made by the following countries: Japan, China, Netherlands, Uruguay, Great Britain, Germany, Italy and Argentina.

While the various exhibits given specific mention in this article by no means exhaust the list of attractions housed in the colossal Palace of Liberal Arts, they are, however, comprehensive and representative, illustrating the general scope of the exhibit of this highly interesting department of the exposition.



The Courts of the Exposition are unquestionably among the most attractive features of the great enterprise. In these courts there is to be found a spirit of beauty and brooding peace that has never before been reached in any work that has not been hallowed by age. It is the dignity and peace of some ancient city, sanctified by time.



Entrance to Court of The Four Seasons from Court of Palms

Live Stock

By I. D. Graham

Associate Chief of Live Stock at Panama-Pacific International Exposition

Editor's Note: The live stock exhibit at the exposition is the most extensive and comprehensive of any exhibition of live stock in the world. More has been offered for premiums and prizes for live stock than has ever before been offered, the total aggregating almost \$500,000. Mr. Graham's article deals comprehensively with these interesting topics. He is a widely known authority, and his declarations will be treasured for many years.

THOUGHT is the deed in the gristle. To conceive of a wonder work and to carry the conception through to fruition under adverse circumstances stamp the caliber of the people who do great things and of the men who are their leaders in thought and action.

The Panama Canal is justly ranked as one of the greatest engineering feats of all history, and the Panama-Pacific International Exposition, which celebrates this achievement, is another wonder work and the greatest of its kind. To have executed the one within the time and money limits only adds to the virtue of the accomplishment, and to have duplicated this record in the building of the other and the throwing open of its gates on the date announced was no less a creditable performance.

As it is true that live animals and birds hold an interest for every human being, and as it is true that the most successful expositions that have ever been held in any part of the world are those in which live stock constitutes an important feature, and as it is further true that the dominant motif of the Panama-Pacific International Exposition is education, and that there can be no adequate exhibit of the resources of any country which does not include its live stock, it is only fitting that the department of live stock should have

been given a large place not only in the exposition but in the special activities which serve to distinguish this exposition from previous ones.

That the interest in the live stock exhibits is general is shown by the fact that there are more than forty pure bred record associations which have appropriated money for supplemental premiums to be awarded to their several breeds, and that the amount so appropriated is larger than that given by such associations to any previous exposition. It is further shown by the fact that more states in the Union have appropriated money for live stock in this exposition than ever before, and these appropriations together with that which has been set aside by the exposition for the payment of premiums aggregate approximately \$500,000.

Every phase of the live stock industry that can be handled within the limitations existing has been provided for by the department of live stock. The displays in this department are made in two grand divisions. First, the view herds and flocks which are to be maintained throughout the period of the exposition from the opening to September 20 as non-competitive, educational exhibits supplied and maintained by the breed record associations; and second, the competitions for premiums

which will take place from October 1 to the close of the exposition.

This maintenance of view herds affords the visitors an opportunity to see the animals in which all are so greatly interested, regardless of the time of their visit to the exposition, and in this respect this department is unique.

The buildings contain more room in fewer structures than was provided for in the last great exposition, and were erected at a total cost of \$150,000. The barns provided for the larger animals are eight in number and contain 1124 stalls. These barns are grouped about the forum or show ring, which is provided with ample seating capacity, and the arrangement is such that all animals are led directly from their stalls into the show ring, thus facilitating the judging.

It has been the purpose of the department of live stock as planned by Chief D. O. Lively and executed under his direction, to make every activity of educational value. Not only are the animals shown in the competition for premiums and in the view herds, but special events are provided for, many of which show their characteristics and their value to mankind.

In spite of the prediction that the motor vehicle would supplant the horse, it is true that there never was a greater demand for horses of quality or at a better price than now exists, and the horse has a very prominent place in the activities of this department. Not only did he appear in the universal polo tournament in March, but is the principal feature of other events as well. In June and October will be held two light harness race meetings in which a total of \$227,000 in purses and stakes will be hung up. In each of these periods of racing there will be one race for trotters and one for pacers for a purse of \$20,000 each, making four different races for this amount.

Then there will be the special horse show, which is of great utility and high social importance, in which provision is made for showing the best qualities of horses of all breeds. In connection with this will be the special

cavalry events provided for the commissioned officers of both the regular armies and the national guards of all countries, to which has been added a series of events for the enlisted men as well.

Problems of importance to the dairy industry and which have not yet been solved by the practical dairyman are being taken up for solution. The feeding of cows for the best results; the balancing of dairy rations from among the available feedstuffs in different sections; the sanitary care of both animals and stables; the sanitation and care of milk for use in ordinary commerce, for the supply of the hotel and restaurant trade, for infants and hospital use as well as for the manufacture of butter, cheese, ice cream and other products is being undertaken; the reduction of the bacterial count; the methods of the medical milk commission and the boards of health; the bacteriological examination of milk together with its chemical tests, and other problems which may suggest themselves form a part of this programme.

Thousands of dollars are lost each year by the flock masters and farmers of America because of lack of care and method in the sorting and grading of their wool clip. In other countries where wool production is a prominent industry great care is exercised in sorting and grading the clip so that the fleeces from the lambs will be baled together and those from the rams in a separate receptacle, while the tag ends of all fleeces are sorted and separated for their own market. It follows as a desirable feature that in this connection will be held a sheep shearing contest in which practical men and women from all countries will compete for the premiums in the use of both hand and power shearing machines. Also there will be held a series of old-fashioned sheep dog trials, serving to demonstrate the remarkable intelligence and training of this most useful helper to the flock-master and shepherd.

In addition to the individual fat classes provided in the different classifications, there will be a competition provided for car lots of

fat animals in order to demonstrate just what are the market requirements for beef, pork and mutton. In this there is a separate classification made for swine of the lard type and another for swine of the bacon type, for the first time in the history of expositions.

There is now being conducted an egg-laying contest in which birds from foreign countries are competing with those from many different states in the Union, and which is provided for the special benefit of the utility poultryman. The poultry show which will be held late in November is provided more especially for the fancy in breeding, and this now promises to be one of the greatest exhibits of poultry and pigeons that has ever been conducted.

There will be a universal kennel show under the rules of the department of live stock of the Panama-Pacific International Exposition, in which dogs of all nations and breeds, with due recognition of equal privileges for each, will be shown. The same will apply to the universal cat show which will also be conducted under the department rules and in which classification is made for all recognized varieties of both long-hair and short-hair cats. This will be followed immediately by the pet stock show, for which full classification is provided.

One of the most important of the special activities of the department of live stock and one of more than ordinary significance will be the show of children's pets, with which the activities of this department will culminate. It is contended that no child can attain to that development of mind and heart which makes for the good of humanity and civilization so readily or at such an early period as when provided with animal pets. Consideration for others, affection, self-confidence and self-reliance, with many another good quality is thus developed which can not come to him so early or so well in any other way. For this reason it is planned to invite the children to bring their pets and enter them for exhibition in competition for the prizes offered and to have these pets judged, not as breeding animals or birds, and not as utility animals or birds,

but simply and solely for their adaptability and usefulness as pets for children.

In carrying out the educational features of this department a large assembly hall has been built on its grounds for the accommodation of numerous live stock organizations which will hold their annual meetings in San Francisco in 1915. This hall is provided with moving picture and magic lantern apparatus and means of demonstration for the public instruction and entertainment.

Feed is provided by the department of live stock for all animals and birds and is sold to the exhibitors without profit. This is done to accommodate the exhibitors, who are thereby spared the necessity of searching for their feed supplies after arrival here, and it is also intended to protect them against extortionate charges.

There is no charge for stall rent, exhibit space, entry fees, or water in the department of live stock, though a nominal charge is made for cooping and feeding the poultry, pigeons, pet stock, dogs, and cats.

The exhibition dates for the different classes and groups of domestic animals in competition for premiums will be as follows:

Horses, mules, asses—September 30 to October 13, 1915.

Cattle, beef and dairy—October 18 to November 1, 1915.

Sheep and swine—November 3 to November 16, 1915.

Car lots of fat stock—November 11 to November 14, 1915.

Poultry and pigeons—November 18 to November 28, 1915.

Dogs and cats, pet stock and children's pets will occupy the time between November 28 and the close of the exposition.

The purpose of the department of live stock is not only to give a great exposition of the results of the breeders' art, but to leave a large and permanent influence for good upon the breeding industry of the world as well as upon the live stock industry of the Pacific Coast regions, and the already assured success of Chief Lively's plans will do all this and more.

Horticulture

By George A. Dennison

Chief of Horticulture of the Panama-Pacific International Exposition

Editor's Note: The horticultural exhibit at the exposition is the most wonderful ever shown. Many interesting displays are presented from China, Japan, England, Australia, New Zealand, Cuba, Canada, the Philippines, The Netherlands, France, and other lands. The vast Palace of Horticulture is one of the most beautiful buildings on the exposition grounds, and Mr. Dennison describes what is to be seen in this building, as well as the out-of-door floral displays.

IN MAGNITUDE and general character, the horticultural exhibit at the Panama-Pacific International Exposition far surpasses all previous exhibitions of the kind held anywhere. It is, also, distinguished as the first ever to be presented in a distinct department of its own by any international fair in the world's entire series. The comprehensive scope of this exhibit, the magnificence, wonder and novel beauty of its displays, the unique plan underlying it all and the wonderfully artistic presentation of the "best of the best" from the horticulture of the many nations participating, render it historical in importance, as well as vastly entertaining and instructive to all who join the exposition's throng of guests.

The horticultural exhibit includes representative displays touching practically every important phase of horticulture as it is carried on in China, Japan, England, Scotland, Ireland, Australia, New Zealand, Canada, The Netherlands, France, Italy, Argentina, Cuba, the Philippines, Hawaii and the following states of this continent: Oregon, Washington, Utah, Idaho, Montana, Nevada, California, Colorado, Kansas, Missouri, Arkansas, Illinois, Iowa, Indiana, Ohio, Louisiana, New York, Massachusetts, Rhode Island, Pennsylvania, New Jersey, Florida, and Maryland.

The general plan of this great exhibit is based on three divisions: The outdoor, the conservatory and the economic display.

MAMMOTH GARDEN

A mammoth garden of nine acres lying to the north of the great Palace of Horticulture and in front of the Inside Inn has been set aside for the outdoor exhibits. Every participating state and nation has a part of its horticultural display in this Brobdingnagian garden. The Netherlands and the State of Massachusetts exhibit out of doors exclusively.

Holland's unified exhibits in this garden are presented under the auspices of the National Board of Horticulture of the Netherlands and are of such character as to represent the quintessence of the floral culture industry as it is famously carried on in that country. A flowering mass of sixty thousand bulbs is but an item in this gorgeous feature of the exposition. Trees that have attained the growth of years in their native Dutch soil are seen here large, beautiful, and flourishing in their new environment, by the side of rhododendrons, trained conifers and numerous other botanical specimens all set out in relation to a definite landscape garden effect, as designed by Mr. D. T. Tersteeg of Maarden, Holland—the most noted among the many famous landscape architects of his country.



A COLONIAL VISTA

The displays of Massachusetts, representing the combined offerings of her best-known growers, constitute a colonial garden in which a fountain and sun-dial are quaint ornamental features. The landscape treatment here, which was planned by Mr. Stephen Child, one of the foremost representatives of his profession in the United States, has a thoroughly practical side, while being also a masterpiece of beauty, as it is designed as an object lesson showing how to make the most effective use of the trees and other forms of plant life represented. Notable features of the Massachusetts floral displays are some wonderful gladioli exhibits by Mr. Arthur Cowes, Mr. John Lewis Child and Mr. B. Hammond Tracy, the most noted gladioli growers in America. There is also a splendid assemblage of stately carnations consisting chiefly of varieties developed by the exhibiting growers. These include the "Princess Dagmar" by Mr. W. D. Patten, and the "Benora," the "Gorgeous" and the "Alice" by Mr. Peter Fisher. Here is illustrated one of the basic plans underlying the whole great horticultural exhibit—to induce each exhibitor to present for uni-

versal inspection and enjoyment whatever is his own original and greatest contribution to the botanical world, whether it be a variety distinguishable for early maturity, rapid growth, sizable proportions, extreme productiveness, commercial superiority; depth of, delicacy or novelty of color; distinctiveness of aroma or flavor, or any other characteristic. This individualizes the displays, attaching to each an element of personal interest apart from other significances.

One of the greatest and most interesting divisions of the outdoor horticultural display is the California Garden. This was laid out by Mr. Carl Purdy, best known for his original botanical work which made possible the domestication of California wild flowers. Among the features included here is an extensive showing of Luther Burbank's famous creations; also wonderful displays of California roses and palms and a great exhibit by C. C. Morse & Co., the famous seed growers.

FROM CHRYSANTHEMUM LAND

The Japanese display in this glorious garden is made under the direction of the government bureau of forestry. The landscape treatment, a rare work of art, is the design of Han-

nosuke Izawa, the greatest of Japan's landscape architects, and it holds many a surprise for the exhibition visitor.

In that portion of the outdoor exhibit known as the "Eastern Garden" is a general area for the miscellaneous exhibits not grouped with the bulk of growers' displays. Here is to be found a magnificent exhibition of roses from Rhode Island and Maryland; wonderful new heliotropes of exquisite color and rich fragrance from New Jersey; iris and peonies from Pennsylvania, and countless other delicate beauties from the many flowering zones of the world.

Great interest has been excited among the rose growers of all nations by the international rose contest in which the exposition offers a \$1000 trophy for the finest rose, unnamed and heretofore unexhibited, but which is to be developed for the admiration of the world for the first time at this exposition. A spacious rose bed which was set apart for these lovely flowering competitors is in itself a spot of novel beauty and is surrounded by the choicest products of such famous English growers as Kellogg & Co. and Sutton and Sons. The prize is to be awarded by an international board of judges composed of botanical experts. Whatever rose receives the vote of honor will be given a name commemorative of the great exposition wherein it grew and blossomed to a world-wide fame. Among the renowned rose growers who have entries in this contest are Mr. Hugh Dickson, Belfast, Ireland; Samuel McGredy & Co., Potstown, Ireland; Mr. E. Pernet-Ducher, Venissieu-Lyon, France; Dobdie & Son, Edinburgh, Scotland; S. Bide & Son, Farnham, Surrey, England; Mr. E. G. Hill, Indiana; Brant-Hentz Flower Company, New Jersey.

WONDERFUL STRUCTURE

The conservatory displays of the horticultural exhibit are held in the Palace of Horticulture. Considered apart from its relation to the wonderful exhibits it domiciles, this structure is in itself a feature attraction. It is colossal in size, 672 by 320 feet, made almost entirely of glass, surmounted by a huge glass

dome 185½ feet high and 152 feet in diameter, larger than that of St. Peter's at Rome. This structure was erected at a cost of \$341,000. Here the different parts of the world that are horticulturally famous present the choicest and most magnificent collection of specimens ever assembled in a mammoth hothouse.

Under the great dome the visitor finds a tropical garden—the exhibit of Cuba. Growing herein is an elaborate and representative collection of trees and other plant forms which made fourteen carloads when brought from tropical Cuba. There is myrcocyclus 1000 years old, royal palms, giant tree ferns, tropical lilies, bamboo palms, bread fruit, banana trees, mangoes, guanabano, cocoanut trees and date palms in actual bearing, and the finest specimens of crotons ever shown in this country.

The Hawaiian exhibit in the Palace of Horticulture is given under the direction of the United States Department of Agriculture. Hibiscus, one of the many forms of vegetable life native in Hawaii, is displayed by the side of other famed and representative plants.

Australia exhibits giant tree ferns whose size eclipses by far that of any heretofore shown in America.

From the Philippines is a great floral treasure bed rich with the blooming exhibit of more than four hundred varieties of dainty orchids, all different but blending their wealth of colors in one indescribable, picturesque expanse.

A feature of Japan's conservatory display is an aquarium of gold fish which gives the typical Oriental flavor to the plant and floral displays of that country, besides being an object of rare interest and wonder in itself.

ECONOMIC FEATURES

The economic section of the horticultural exhibit is also housed in the Palace of Horticulture. The dominant idea in the displays here presented has been to show plant life and its products in relation to actual use—rather than to mass mere objects of curiosity and rarity for idle sightseeing purposes. Herein the horticultural exhibit at this exposition

marks another distinct departure from precedent and places itself on a unique and practical basis. As a whole, this part of the exhibit is a great industrial demonstration, of instructive value and interest, showing processes as well as products.

A model cannery, the combined exhibit of the National Canners' Association, is shown in operation, conducted under the direction of Doctor and Mrs. A. W. Bitting, the most noted food technologists in America. Doctor Bitting excels as a chemist while Mrs. Bitting is an expert microscopist. This cannery exhibit demonstrates the various processes involved in fruit canning from the moment the fruit is received in lug-boxes to the final matter of being crated for delivery to the grocer. No detail has been omitted and everything is done in public view. As the canning industry is one in which horticulture reaches its fullest and most practical commercial expression, this feature of the great exhibit is proving one of overwhelming popularity.

Similarly, there is an orange packing house showing every process involved in this industry—receiving, brushing, grading, wrapping, boxing and mailing. A raisin seeding exhibit instructs the world graphically as to the labor and methods required in preparing this commodity for market.

Another intensely interesting feature is presented by C. C. Morse & Co., whose demonstration is of packing flower seeds for retail distribution. Each variety of seed thus featured is shown in the fulness of its final flowering glory by an extensive exhibit of blooming pot plants.

A comprehensive exhibit of dried fruits in air-tight, sanitary packages of various popular

sizes illustrates the modern tendency (brought about by the encouragement of Wells, Fargo & Co.) of doing away with carrying exposed fruits in bulk quantities.

An ingenious display of horticultural machinery shows practically everything up to date in the line of appliances and implements used in the care and handling of the soil, plant forms and their products. And a display of allied interest and of wonderful beauty is the exhibit of objects for garden ornamentation, of which fountains, garden seats and statuary are exemplary. The state exhibits included among those of the economic division illustrate the various phases of horticulture as carried on in their respective localities. To this end there have been entered many splendid exhibits of fresh and dried fruits, commercial packages of horticultural products, and photographs showing orchards and gardens and methods employed in their cultivation.

FIVE-FOLD PURPOSE

As a whole the horticultural exhibit at the exposition was planned with a five-fold purpose—to appeal with equal interest to the tourist, the visitor, the student, the business man and the investor. The tourist sees the pride and glory of the soil from the "other" sections of the world; the visitor is entertained by the beauty and novel wonder of all that is before him. The student finds an unequalled opportunity to increase his store of knowledge of all points pertaining to the horticulture of the earth. The business man finds the exhibits of commercial products so arranged as to permit the placing of orders on the spot. And the investor is enabled to discover, through actual living evidence, the productive possibilities of soil from almost every section of the earth.

MAN IS incomprehensible without Nature, and Nature is incomprehensible apart from man. For the delicate loveliness of the flower is as much in the human eye as in its own fragile petals, and the splendor of the heavens as much in the imagination that kindles at the touch of their glory as in the shining of countless worlds.—*Hamilton Wright Mabie.*

Food Products

By Thomas G. Stallsmith

Chief of the Department of Agriculture, Panama-Pacific International Exposition

Editor's Note: This department was organized on April 1, 1913. It contains two great palaces, the Palace of Agriculture, embracing a floor area of approximately eight acres, and the Palace of Food Products, covering the same amount of ground. In addition to the exhibit space in these two palaces much outside space is devoted to exhibits of agricultural machinery, pumps, windmills, and forestry exhibits. Mr. Stallsmith's article describes some of the principal features illustrated by his department.

AS AGRICULTURE is the most fundamental and varied of the industries, the exposition's exhibit of all that pertains to agricultural pursuit and food products has been planned on a scale of magnitude and diversity that reflects their importance and multiform character. The exhibits are contained principally in two great palaces—the Palace of Agriculture, embracing a floor area of approximately eight acres, and the Palace of Food Products, covering about the same space—while an outdoor area is occupied by forestry exhibits as well as displays of agricultural machinery, pumps, and windmills, and a portion of the Palace of Machinery houses the exhibit of the office of public roads, this being a branch of the exhibit of the United States department of agriculture.

Listed by classification the whole exhibit of agriculture and food products consists of displays reaching into the numerous interesting phases of farm equipment and methods of improving lands, agricultural implements, and farm machinery, fertilizers, tobacco, appliances and methods used in agricultural industries, theory of agriculture and agricultural statistics, vegetable food products and agricultural seeds, appliances for gathering wild crops and products obtained, animal food products,

equipment and methods employed in the preparation of foods and beverages, farinaceous products and their derivatives, bread and pastry, preserved meat, fish and vegetables, sugar and confectionery, condiments and relishes, nut and other foods, waters and unfermented fruit juices, wines and brandies, syrups and liquors, distilled spirits and commercial alcohol, fermented beverages, inedible agricultural products, useful insects and their products, injurious insects and plant diseases, forestry, and forest products.

The exhibits included here are drawn from the following states and foreign countries: California, Utah, Washington, Louisiana, Michigan, Ohio, Missouri, Colorado, Iowa, New York, Oregon, Illinois, Kansas, Nevada, Massachusetts, Indiana, Alabama, Georgia, Virginia, Pennsylvania, Wisconsin, Montana, Arkansas, Porto Rico, Cuba, Philippine Islands, Japan, China, New Zealand, Uruguay, Italy, Netherlands, Argentine, Spain, France, and China—in addition to an extensive and extremely interesting exhibit by the United States department of agriculture.

The governmental exhibit of our own country comprises displays made respectively by the bureaus of plant industry, animal industry, chemistry, weather, biological survey, forest

service, the office of experimental stations, and the office of public roads—all being branches of the federal department of agriculture.

INSTRUCTIVE EXHIBITS

The bureau of plant industry shows specimen varieties of grains, both in heads and in the seeded state, as well as of corn and rice, and illustrates through its exhibit the government's work in grain standardization. Fac simile models of fruit are used for an instructive object in showing numerous forms of fruit diseases. A cross-section miniature steamship with a cargo of corn shows the deterioration to which various portions of the cargo are liable, depending upon relative proximity to the surface. Other phases of the exhibit of this bureau relate to tobacco, fibers, plants grown for drugs, soil bacteriology, and seed investigation.

The exhibit of the bureau of animal industry is divided into four parts: Meat inspection, field inspection, animal husbandry work, and dairy work. The first of these includes a comparative display of healthy and diseased tissue, along with pictures of inspectors at work; and a miniature model of a municipal abattoir shows the type of slaughter house recommended for the use of small cities. The exhibit group relating to field inspection contains models illustrating the best methods of dipping cattle and sheep for the eradication of disease. Poultry has come in for a generous share of attention in the government's work in animal husbandry, as the exhibit at this exposition would indicate. Here are models of the types of houses, trap nests, etc., used on the experimental poultry farms of Uncle Sam; an incubator is employed to show the more rapid deterioration of fertile over non-fertile eggs, proving the advisability of producing only non-fertile eggs for market; comprehensive collections of poultry feathers are also exhibited, as well as a remarkable collection of ostrich feathers "grown in America" and loaned for exhibition by the Arizona Ostrich Growers Association; an extensive collection of eggs of domesticated fowls, including the ostrich, is another interesting item in this display; here,

too, is an exhibit of wool clippings and hides; and work in developing horses for army remounts is shown by a series of pictures. Uncle Sam's tireless efforts directed toward the clean milk movement are typified by the exhibit relating to the dairy work done by this bureau. A miniature model shows the type of dairy approved for its features of sanitation and convenience, and a series of forty-eight interesting pictures tells without words "The Story of Clean Milk," dealing with every detail involved in its handling from its extraction from the cow to its delivery to the consumer.

FOR PURE FOOD

What the government is doing to enforce the pure food and drug laws, the net weight and package laws, and the insecticide laws is revealed by the exhibit of the bureau of chemistry. This bureau also has an exhibit showing the chemical constituents of well known brands of baby food; and allied to this phase of the display is an exhibit which "shows up" various patent medicines which federal investigation has proved to be "fakes."

The weather bureau has on exhibition all the different kinds of apparatus used in its service, even to a balloon, a box kite, and instruments for determining atmospheric conditions far overhead; and a huge map gives a complete daily report of weather conditions in all parts of the United States.

As the work of the bureau of biological survey is to determine which of the wild animal forms are beneficial and which harmful, to study likewise their habits, and to determine further the best means to their extermination or preservation, according to whichever is desired, the exhibit of this service is instructive along those lines. Items in this display are an elk group, prairie dogs, birds, both of beneficial and injurious varieties, and a map showing the migrations of the principal birds.

The exhibit made by the bureau of forest service is designed principally to show the work in the administration of national forests. Models of forests, transparencies, and colored pictures are devoted to that end. There is also an exhibit of forest products, and a model

of a fire lookout tower and the tools employed in fighting forest fires.

Interesting features in the exhibit of the office of experimental stations are models showing methods of irrigation and drainage; a calorimeter model—a modern; scientific instrument used to discover the energy values of different foods; and a kitchen embodying both in construction and equipment certain ideal features that make for both sanitation and efficiency.

The exhibit installed by the office of public roads and contained in the Palace of Machinery, comprises thirty-eight road models illustrating many types of road construction, and shows the historical development of roads from those in the days of the ancient Appian Way to the present-day macadamized road. Another part of this bureau's exhibit shows the locations of roads in the national reserves.

Picturesque in character is the Idaho agricultural exhibit which includes a reproduction of the famous Shoshone Falls showing the agricultural valleys of that region and the system of irrigation employed.

CUBAN SCENES

Cuba has sent a reprint of Morro Castle with a painting of Cuban agricultural scenery, together with displays of tobacco, rice, and other characteristic products of her soil.

From the Philippines has come one of the finest collections of high grade woods ever assembled for exhibition. Many of the varieties are exhibited as hardwood floors showing the high polish which they are capable of taking. In another instance a choice variety is displayed in form of a huge one-piece table, twelve feet in diameter, beautifully and highly polished. Native Philippine gums, useful for making varnishes, lacquers, shellacs, etc.; tobacco, rice, and sisal fiber grown in that land are also on exhibition.

New Zealand has contributed a display of refrigerated meats and butter.

The exhibit of the state of Washington is quite comprehensive and of great interest, showing in minute detail every process involved in the fish canning industry beginning

with the spawning stage and ending with the final canning of the actual fish. A feature is the demonstration of the "Iron Chink"—a machine which beheads, cleans, weighs, cuts, slices, and cans the fish, all without their once coming in contact with human hands.

The United States Bureau of Fisheries has a large exhibit showing fish hatcheries in operation, and the Pacific Coast Fisheries Association has a display occupying 1200 square feet of floor space.

FARM IMPLEMENTS SHOWN

Farm implements are shown exhaustively in the Palace of Agriculture. The International Harvester Company, occupying a floor area of more than 22,000 square feet, has a most extensive display of its agricultural implements—all in operation. The Holt Manufacturing Company, too, has an exhibit of its farm machinery, one of the unique and ornamental features of this display being a farm house—complete in every detail—built of solid oak. Numerous other manufacturing concerns of prominence have their implements arrayed for the inspection of visitors; the result is one of great instructive value not only to farmers but also to the entire sight-seeing world.

A huge exhibit installed by the Sperry Flour Company shows by actual demonstration all the processes gone through from the cleaning of wheat to the baking of the characteristic breads and pastries of the many nations of the world after the flour is finally made. The mill in which the wheat is reduced to flour occupies three stories of the building, has a capacity of 360 sacks of flour per day, and is of the very latest design. In a most up-to-date mechanical bakery the many steps from wheat to bread are shown without human hands once touching the product. Mechanical exhibits in this connection show the scientific side of the milling business. But the most spectacular feature of this exhibit is in the Booth of All Nations in which bakers in characteristic national costume demonstrate the uses of Sperry products in the making of the special confections and pastries of the different parts of the world.

The exhibit made by the Albers Brothers Milling Company is a colossal bowl of mush through which the constant play of a jet of steam gives the appearance of ceaseless cooking, and "kewpies" are as constant in their tasks of stirring and pouring cream into this great receptacle with its steaming contents.

One of the joint exhibits in this department of the exposition is a model kitchen equipped with only the most modern appliances of the culinary art, and presided over by Mrs. Louise Andrea of New York, a noted teacher of cookery and originator of recipes for food products.

The California Viticulture Association offers in a joint exhibit all the famous California vintages displayed symbolically in a handsome booth built in pergola style and decorated with grapevines in natural color.

A very unique feature in another of the joint exhibits in the Palace of Food Products is that presented by the California Central Creameries. Baskets of flowers and various floral designs are moulded in butter; lilies,

daisies, and such specimens as can be faithfully represented by the color of butter are included, and so perfect is the likeness to the real living flowers that they can scarcely be distinguished. This display is the art work of Mrs. E. M. Cooksley of New York.

There are many exhibits of tobacco products. One of the most picturesque of these is that of the Petri Italian-American Cigar Company whose booth is presided over by Italian women *tobacqueros* in national dress.

Supplementing the many exhibits proper are a number of motion picture theaters in the Palace of Food Products in which free entertainments are offered. One of these is devoted to the uses of exhibitors not otherwise provided for in this scheme. To describe or even list in thorough detail all the various displays housed in the two great palaces given over to the exhibition of the numerous phases of agriculture is impossible in the space at hand. Comparatively speaking, only a handful of the many vastly interesting displays has been mentioned in this article.



Crowds at Dedication of S.P. Building

Landscape Gardening

By Donald McLaren

Acting Chief of Landscaping, Panama-Pacific International Exposition.

Editor's Note: Mr. Donald McLaren is the son of Mr. John McLaren, whose reputation was made even before he undertook the tremendous responsibility involved as chief of the landscape engineering at the Exposition. Mr. Donald McLaren, like his father, is recognized as one of the great landscape experts of the present day. Indeed, it is the opinion of noted visitors from abroad that the landscape effects at the Exposition have not only never been surpassed, but have never been equaled anywhere. Mr. McLaren's article describes some of the interesting landscape features.

TO CONVERT a 635-acre expanse of barren sand dunes into a famous landscape; to have it verdant, flowering, and boasting of full-grown trees and shrubs from various quarters of the earth; to make it in every way picturesque and beautiful in a degree befitting its association with the most wonderful and highly artistic architecture of the day; to bring about this great transformation in but two years' time may see incredible at first report. Yet such was done in beautifying Harbor View at San Francisco as the site for the Panama-Pacific International Exposition.

That this task was one of magnitude and presented more than normal difficulties can be understood readily when it is considered also that all the great areas to be planted were composed of drifting sands or of sands pumped in from the bay, upon which no ornamental plants of any character might cherish a hope for existence. The entire planting areas, therefore, required covering with good surface soil to a depth sufficient to maintain lawns and the infinite varieties of trees and garden plants which today, in their full fruition, clothe the Panama-Pacific International Exposition grounds.

The landscape phase of the exposition, then, aside from being a magnificent scene for the visual delight of the world, may be regarded also as a miracle of accomplishment to the great triumph of California soil and climate as well as to scientific application. The trees and shrubs which were transplanted in their full-grown state and replanted here took to root without adverse struggle, and the smaller flowering plants developed with an amazing swiftness, as if conscious of the importance of the part they were to play in the big plan of decorating, and anxious to do it promptly and well.

Another landscape problem, special with the Panama-Pacific International Exposition, was presented by the duration of this exposition. Opening on a winter date (February 20) and scheduled to close on a winter date (December 4), evergreen varieties exclusively were necessarily required in the trees and shrubs used. By a scheme of rotation for the smaller plants in the blooming beds, the floral blaze of color will be without interruption throughout the whole continuance of the fair.

UNIQUE DESIGN

The general landscape design of this exposition site is not after the pattern of any

other. It is rather a treatment developed in determining the most effective way to handle the variety of special situations which this particular site presented. On account of the varied conditions prevailing in the different parts of the grounds—some spots being bleak and exposed, while others are naturally sheltered and protected—there has been an abundance of opportunities for using many classes of plants. In fact, in some of the southern exposures of the inner courts, many high-class semi-tropical plants such as palms, bananas, tree ferns and weigandies have been used with exceedingly good effect.

The height of the buildings, too, had to be taken into account in planning the general landscape scene. The uniform height of the various structures being sixty feet, from the ground to the cornices, extremely large trees have been banked up against them. For this purpose much use has been made of cypress and eucalyptus in heights ranging from thirty to fifty feet. All of these trees were taken from Golden Gate Park and the Presidio reservation, and their total number represents the largest collection of evergreen trees ever moved in connection with any landscape work.

In the general plan of lay-out there are three main avenues which make use of large specimen palms and other trees. The East Driveway, between the Palace of Machinery on one side and the Palace of Varied Industries and the Palace of Mines and Metallurgy on the other, has groups of individual specimens of *Dracaena indivisa*—all well branched and averaging twenty feet in height.

The buildings named above are clothed with Monterey cypress, banked up with Lawson cypress and *Thuja gigantea*, in front of which are specimen plants of various firs and spruces, and individual specimens of Spanish fir or *Abies pinsapo* have been set out between them and the Dracaena Avenue. In front of the firs and spruces a magnificent blaze of color will be maintained. During the opening days of the exposition bright red azalea of Japan keeps that stretch of earth bright, to be followed by a bank of hybrid rhododen-

drons from Europe, relieved by a sprinkling of Japanese lilies of various kinds. The last planting in this rotation will be of *Hydrangea hortensis*, a handsome flower of pink color.

The South Driveway is planted out in specimen plants of Canary Island date palms, alternately spaced every thirty feet by California fan palms—all ranging from eighteen to twenty-five feet high. There is a double row of these on each side of the half-mile driveway. The trunks of these palms are planted with hardy ferns interspersed with color furnished by ivy-leaf geraniums, mesembryanthemum and other plants. Passion vines, planted at the bases of the palms, run up the trunks and out over the leaves, dropping their brilliant flowers down from the ends of the leaves in a beautiful festoon effect.

Facing the South Driveway, and against the south fronts of the buildings, are specimen plants of blue gum trees, forty to fifty feet high, banked up with smaller growing varieties of eucalyptus, and in front of these are banks of yellow flowering acacias set off by beds of flowering shrubs and pansies, which will be replaced later on during the exposition by flowering perennials, and after that by dahlias.

The West Driveway too has made much use of eucalyptus. It is used there as a street tree as well as banked, in various specimens, against the faces of the buildings. Variety in effect here is attained by other kinds of plants, including many handsome blooming favorites.

UNINTERRUPTED VIEW

For an obvious reason, the North Driveway, fronting on the North Gardens and giving magnificent views of San Francisco Bay and the hills of Alameda and Marin counties, is not lined with avenue trees. Against the buildings exposed to this driveway, however, Monterey cypress trees, forty to fifty feet in height, are growing, banked by smaller specimens of the same variety together with hardy species of acacias.

"Fountains and waters are the soul of gardens," said a distinguished Frenchman two centuries ago. That this theory is accepted to-

day finds proof to some extent in the landscape of this exposition. The various pools and fountains and lakes which abound here as part of the architectural scheme have utility also in adding to the effectiveness of the numerous forms of plant life which are arrayed with graceful poise in this landscape garden design.

Because of the magnificent views obtainable from and across the North Gardens, the plantings here have been restricted to simple lawns relieved by groups of low-growing hardy, ever-green shrubs.

FINE ARTS LAKE PICTURESQUE

One of the most picturesque spots in the entire landscape is afforded by the Fine Arts Lake. Here the treatment has been confined to the natural. Natural groups of evergreen shrubs rise from the small promontories and inlets of the lake. Many large trees and shrubs, as well as 10,000 periwinkle, have been set around the borders of the water. Here, too, have been planted violets—a mass of 5000 plants—whose delicious odor rises with welcoming effect from a bed of green and purple beauty. A simple little garden retreat with nooks and resting places lies north of the Fine Arts Lake.

The South Gardens embrace the entire territory between the Palace of Horticulture and Festival Hall. Situated herein is a French garden containing three large and magnificent pools, and ornamented with several small fountains, balustrades, and bursts of gaiety in the form of blooming flower beds. Rising from a solid expanse of yellow pansies is a beauteous bloom of yellow daffodils. Here, too, the scheme of color rotation will be followed. The pansies and daffodils will be followed by a gorgeous bed of red tulips, and the final planting will be of *Begonia erfordi*—beautiful flowering plants having blossoms of dainty shell pink. The rotation for this single part of the whole landscape involves more than a quarter million plants.

Along the southern edge of the South Gardens is a very unique effect which marks an original treatment. A hedge twenty feet in

height, eight feet wide and 1150 feet in length is built by a masonry of 7500 boxes of *Mesembryanthemum spectabilis*—a green plant very effective for such a use.

On both sides of Festival Hall and the Palace of Horticulture four imposing groups of trees, fifty feet high, have been planted to give the harmonious touch demanded by the domes of those great structures. Monterey cypress, Monterey pine and different species of acacia are utilized banked up with other kinds of trees of lesser size, while specimen plants of Lawson cypress and *Thuja gigantea* in the surrounding lawns give finish to the groups.

Each of the main courts having a distinctive architectural character and special significance, the landscape treatment in each has been made in conformity.

The North Avenue leading to the main court, known as the Court of the Universe, is distinguished by hedges of heaths, massed in variety and banked with red azaleas. When these flowers have passed the period of their blooming glory the expanse of flaming red will be maintained by rhododendrons.

The main court itself is decorated with Italian cypress—a handsome and imposing variety of tree whose effectiveness in its treatment here is strengthened by the height of the trees, reaching forty feet in the air.

In the West Court, or Court of the Four Seasons, an evergreen treatment of trees and shrubs likewise prevails. Here have been used some of the higher types of acacia and other trees, and ample color is given by the free use of specimen bougainvilleas, which have been trained in columns twenty feet high; also pillar roses of the same height, and a handsome assemblage of hybrid rhododendrons, while water lilies motionlessly swim the surface of the pools.

In the Court of Abundance, lying to the east, a feature is made of California orange trees transplanted from the citrus zone with their golden globular fruit still on them serving as a wonderful and colorful ornamentation. Here also are yews and formal Italian

cypress trees, and a lavish profusion of spring flowering bulbs and summer flowering annuals add brightness and greater beauty to the whole effect.

As the name would suggest, the Court of Flowers is distinguished by its abundance of bright colored flowering plants of many species renowned both for beauty in form of blossom as well as color. Azaleas and a wonderful collection of heaths are also used.

The Court of Palms, besides its showing of the different palm varieties, presents also a collection of sweet-smelling shrubs, among them being myrtle, breath of heaven, lavender, lemon verbena, rosemary, and others.

The Horticultural Garden, while being an integral part of the great horticultural exhibit, also joins harmoniously in the general landscape effect of the whole exposition and will be a section of intense interest and instruction.

The California Garden lies within the old cypress hedge around which the California Building was built, and its general plan is in

replica of the Forbidden Garden in the famous Santa Barbara mission. Only native California plants are grown in the California Garden. Among them are such favorite and typical species as wild poppies, Sequoias forty-five feet high planted in groups, madrone, palms, and masses of bulbs and other flowering plants whose compactness makes a carpet of exquisite color and design from which the larger shrubs and trees rise in their stately heights. In general the scheme of the California Building's exterior and the California Garden together is to epitomize the State as she is known in art and nature. Mission architecture and native flora join in unity of purpose.

Taken as a whole the landscape garden effect of the Panama-Pacific International Exposition is more than a poetic vision of outdoor beauty—it is a great landscape epic, impressive beyond words, and eloquent of the wonderful fecundity of California soil and of the magical maturing power of her climate.

THESE are many principles to apply, and many essentials to provide, if we would add years and decades to life, and retain youth, virility and power all through life; but the most important essential is to live for some great and wonderful goal—to work for something of tremendous value to the individual and the race—to have some extraordinary object in view that *must* be realized in this life before we can think of going elsewhere.

Whatever your age now, be it fifty, seventy, or ninety, begin at once to build for a greater future than you ever dreamed of before; and fill your soul with persistent desire, unbounded enthusiasm, and invincible determination to live to see this great dream come true.—*Eternal Progress.*



The agricultural demonstration is San Diego's boast. The model intensive farm and the demonstration of large scale farming are rivaled as interest arousers by the great citrus orchards

The Panama-California Exposition

By Mark S. Watson

Director of Publicity, Panama-California Exposition.

Editor's Note: Mr. Watson in the following pages gives a clear idea of the methods by which the San Diego Fair has been made a success virtually from the start. His account will prove most interesting reading. The beautiful, natural setting of the Panama-California Exposition, together with the unique ideas employed in its construction, are noteworthy reasons for its delightful qualities and its popularity with visitors.

IF SAN DIEGO'S Panama-California Exposition, which was started several months before the Panama-Pacific at San Francisco, had been allowed to go ahead, without the holding of the larger fair at the north, San Diego would undoubtedly have built an exposition patterned after those of Chicago and

St. Louis. With the assistance of the extraordinary climate of Southern California it would undoubtedly have been beautiful, but there would have been little else to commend it above all other fairs.

Soon after the exposition was started, however, it was announced that San Francisco would build an international fair, in scope, in



The largest outdoor organ in the world, its curved colonnades partially encircling the Plaza de los Estados. It is permanent

purpose, and in treatment broadly similar to the great world's fairs of the past.

San Diego was faced with the question of whether it would build a similar fair, or develop one along entirely new lines, or abandon its own original idea. The last was inconceivable. The first was obviously inadvisable. The remaining alternative was the best, and as time went on it was found to be far better than it was guessed at the outset. By adopting an entirely new form of architecture so far as exposition treatment was concerned, the Spanish Colonial, there was achieved a result nothing short of amazing. By adopting a new idea in entertainment features there was gained an atmosphere which no other fair ever conjured up. By adopting a new field for development the exhibit feature—the *raison d'être* of any fair—leaped into importance chiefly because of its novelty, timeliness, and sincerity.

At some time after the opening of every fair there has come to its managers the sorrowful realization that mere size and number of exhibits are not sufficient. There is the memory of the surprising speed with which the visitors fairly galloped through vast halls crammed with exhibits which had taken years to assemble. This was the first field for endeavor which San Diego noted, and here came the first radical change.

NO COMPETITIVE EXHIBITS

"There will be no competitive exhibits," came the ruling. "The bulk of our visitors will not care to see forty variants of the same machine. They will wish to see only the best example of a type. Moreover, they will wish to see it so displayed as to demonstrate just what it does and how it does it."

Hence there is not an exhibit by a dozen manufacturers of baking machinery. There is one section of the Varied Industries Building

taken by a large flour milling company, the whole display back of plate glass. On the upper floor is a dough mixing machine of the latest type, which accurately measures constituent parts and sends a river of dough down an inclined plane to a kneading machine, thence out through a cutter which measures the dough for loaves so nicely as to show no appreciable variation in a run of several thousand. Here are the trays on which the loaves are placed and carried over to the electric and gas ovens, and beyond these the wrapping room and the sales room. An added feature is the lecture room for housewives. The whole thing is a singularly effective demonstration of one important branch of household economy. Incidentally, this exhibitor supplies all breads used on the exposition grounds, and instead of meeting a heavy expense charge each month, clears a neat profit.

In the same building is an orange shipper, who has given up a large part of his space to

an orange sorting and packing machine and another machine for quick preparation of juice. These attract the attention of visitors who immediately become desirous of sending to some one in the East a small box of oranges grown within a short distance of the San Diego Exposition—and find the boxes ready for immediate shipment. A hundred examples could be cited, but these are sufficient to call attention to the human nature of the exhibits and the effectiveness of San Diego's leap forward from old time traditions.

Understanding of the agricultural display, the most notable one which any world's fair has devised, must be preceded by some information as to what the exposition is trying to do, not for the city of San Diego, but for the great West which has responded generously to San Diego's invitation. The upbuilding of the West has been rapid, but its uninterrupted progress must be based on one essential—the development of the enormous resources in the



Vice President Marshall and other distinguished visitors review the parades held in the Plaza de Panama

soil. Thus San Diego seeks to call the world's attention to the West's farming resources, not by oratory, not by printed matter, but by intelligible and intelligent display. The largest agricultural implement manufacturer in the world has taken the largest exhibit space that company ever took, and is simply enlisting the aid of San Diego's all-year climate. It has set out an orchard in which there are bearing trees—treated with the cultivators, the fertilizers, and the other orchard machinery which that company makes. It has reserved another great space where that company's tractors and plows and reapers are at work. It does not stop with giving the farmer the information he wants. It gives the city man the information which would enable him to start farming, and also the impetus to make use of that information.

INTENSIVE FARM

The tourist finds adjoining this display a model intensive farm which explains to the Easterner that a great tract is not necessary for profitable farming, that results can be attained on a few acres, and that the farmhouse can be as comfortable, under modern conditions, as the city residence. Or he can go across the way and see an orange and lemon orchard in full bearing power. Or he can see a tea plantation transplanted from Ceylon, an appealing substitute for the conventional tea display. Up this same road he can see farming implements of many types performing the feats which only modern methods can perform.

The belief is that this will start a back to the land movement of great proportions. The Western states exhibiting and the California sections which have their own impressive displays are making use of that possibility and in their individual buildings are showing what they have to offer to the settler. What is true of farming is equally true of mining, or forestry, and other fields of endeavor.

The effort to have the exhibits comprehensible is followed out even in the difficult realm of anthropology and ethnology, in which the

United States National Museum has been one of the chief contributors. The display in the Science of Man Building is so arranged as to be grasped in its broadest features by the casual visitor. In its detail it strikes home as the best offering of the sort which world's fairs have shown, this being recognized at the outset by the scientific societies which have visited the exposition. It is worthy of mention that some of the casts of the exhibit are now the only ones in existence, being the only copies of certain casts destroyed in the European war. The portrayal of conditions among the ancient Mayas and Aztecs and Incas and Toltecs is incomparable.

ON THE "ISTHMUS"

And there are less serious features. As in all cases, there is the "Pike," or "Midway," only here it is the "Isthmus," another reminder that both California expositions celebrate the opening of the Panama Canal. The canal itself is duplicated in miniature in a remarkable manner in one of the largest concessions. Indian life of the Southwest, with 200 Apaches, Navajos, Supais, Hopis, and Zunis weaving their rugs, shaping their pottery, and hammering out their metal ornaments in a setting which has reproduced with extraordinary fidelity the Painted Desert. There is a typical California '49 camp. There is an Hawaiian village, and along the street the many other attractions of an amusement character. In the streets of the exposition itself wander Spanish singers and dancers.

San Diego faced a big task, and overcame it. The smallest city which ever built a fair of these proportions has witnessed the entirely novel feat of having it go on a paying basis in the second of its twelve months of operation, and add steadily thereafter to net profits. Far more important, it is accomplishing the results at which it aimed. It is calling attention to the possibilities of the great West in the most effective manner the West has ever been exploited for permanent results. The nation will be the winner.

CALIFORNIA'S WOMEN

EDITOR'S NOTE

THE articles in the following pages, written by a score of the representative women of California, are not presented as a complete digest of what women are doing in the intellectual, economic, and industrial development of the state. They are only typical.

But between the lines may be discerned the characters which spell the general intent of woman's participation along those avenues. They disclose her earnest endeavor to do the things which shall make for the betterment of her state and the improvement of the conditions in which she and her children and her men-folk live.

It will be seen that there is no difficulty which daunts her, no work of which she is fearful, and no avenue which she considers closed to her sex.

The collated articles are but a fragment of what might have been presented had space permitted. But they are representative and, we believe, are a credit to the womanhood of California.





Honorable Phoebe A. Hearst

California as a Field for Women's Activities

By Hon. Phoebe A. Hearst

*Honorary President of Women's Board of Panama-Pacific International Exposition
and Regent University of California*

AS THE RESULT of many years' observation and experience of California life I do not hesitate to state the following facts which may be of interest to women who contemplate making homes in California:

In California women have been recognized since pioneer times as physically and intellectually qualified to occupy high positions of trust and responsibility in connection with public affairs, and have discharged the duties of such positions with popular recognition of their efficiency as well as with popular approval of their devotion and energy.

In California enterprises women have always participated not only as owners, but as directors and managers, and have certainly attained as high percentage of success in such affairs as men have. It is no surprise in California that a woman should decide to direct her own business affairs. On the other hand, it is rather expected that she will manage them, for during the several recent decades of rapid development of the finance and industry of the State women have made good in such undertakings.

EDITORIAL

*M*RS. PHOEBE APPERSON HEARST has lived so long in California that she may almost be regarded as a native daughter of the Golden State. But she was not born in the West. She came to California in 1862, six months after her marriage to George Hearst, who later became United States Senator from California. She was born in Franklin County, Missouri. William Randolph Hearst, the newspaper owner and publisher, is her only child.

Mrs. Hearst has two homes in California, the famous Hacienda del Poso de Verona, at Pleasanton, in Alameda County, and a chateau on the McCloud River, in the north.

At the Hacienda Mrs. Hearst presides as a princess over a splendid demesne. Here she entertains in a lavish manner at big affairs of public import or at the small, intimate functions incident to her social position.

All over the world Mrs. Hearst is known as the Lady Bountiful of California, and as the First Lady of the State. For this reason, and because she is personally loved by those who are privileged to know her, she was chosen to be the honorary president of the Woman's Board of the exposition, which body is now dispensing the State's hospitality at the California Host Building at the exposition.

Her philanthropies, public and private, her generosity to institutions of learning, and enterprises of scientific research, her kindly nature and sweet, womanly graciousness to all with whom she comes in contact have placed her at the top of the long list of California women held in high esteem by the general public and in the deepest affection by those who come within the charmed circle of her personal friendship.

The enfranchisement of women in California was the logical result of the foregoing demonstration. It was not a whim or sentiment of men, for whims and sentiments were generally against it. It was an irresistible evolution from California experience, and it stands as a surety to coming women that they will be free to act in public affairs and in their own business and that they will be appreciated and judged just as men are in similar undertakings.

In social affairs women in California are less hampered by tradition and convention than in older communities. This is their share in the glorious freedom of the West.

In home-making California women have notable advantage over their sisters who are called upon to perform domestic duties in cold, wintry, or sultry summer climates. California homes cost less to build because equal grace and capacity of habitation can be had without providing strength against snowfalls and exclusion of zero temperatures. In houses which befit the California climate and which would be regarded as summer shelters in the East, or in Northern Europe, one can provide modern plumbing with all its conveniences without exceeding the cost of the mere shell of a house in a wintry country. And then the almost continuous open air life of the family, the health and vigor of the children, and the better nature of the man-of-the-house are all joys beyond estimation to the housewife. Whether it is their lot to live in city mansions or tenements, in country villas, or in board cottages colored only by the climbing roses, the California climate works constantly with and for the women, and the California spirit which illumines the home gives them strength and joy in the duties they are called upon to perform.



Mrs. Frederick G. Sanborn

Work and Purposes of the Woman's Board of the Panama-Pacific International Exposition

By Mrs. Frederick G. Sanborn

President of Woman's Board

MRS. FREDERICK G. SANBORN (Helen Peck) came to California so early in her childhood that she almost may be considered to be a native of her beloved West. She has lived more than thirty years in the home in Dolores Street in San Francisco which is her present address. She was the spontaneous and unanimous choice of the women of California as the president of the Woman's Board of the exposition, and has administered the affairs of the office with a gracious dignity, a remarkable tact and a masterful executive ability. No detail of the work involved was too trivial to merit her attention, and no phase of it too perplexing or too large in scope for her grasp. From the first organization of the Woman's Board she has had a clear vision of the methods by which to insure the state-wide sympathy of women in exposition participation, and the unfolding of events each day proves that she builded better than she knew. Mrs. Sanborn has been president of the Century Club and the Sorosis Club of San Francisco, and during the Spanish War was vice president of the San Francisco Red Cross Society. She has always been officially connected with relief work and an active worker therein. She is president of the Protestant Orphan Asylum of San Francisco, the oldest organized charity on the Pacific Coast — [EDITOR'S NOTE.]

THE Woman's Board Panama-Pacific International Exposition, composed entirely of California women, was organized in the interest of the exposition, and in order that it might be financially and legally responsible, was incorporated under the laws of the State of California.

The association of which the Woman's Board constitutes the executive body consists of the stockholders and auxiliary members.

County auxiliaries of the Woman's Board have been organized generally in the fifty-eight counties of the State, so that many

fine California women are making a concerted effort to assist in the great work.

There is no woman's building at the exposition, as the men and women of California are accustomed to working together. Women's work is placed in the various departments of the exposition and not displayed or judged as women's work.

It is the pleasure and duty of the Woman's Board and its auxiliaries, serving as hostesses for California, to meet, greet, and entertain visitors to the Panama-Pacific International Exposition, endeavoring to make all welcome. In addition to hostessing their

exposition, the Woman's Board has, from the fund contributed by the women of the State, furnished the California Host Building, guaranteeing to maintain it throughout the exposition and assuming its entire responsibility.

In addition to serving as hostesses during 1915 at the exposition and in San Francisco, the county auxiliaries also welcome guests in their several counties. California has invited the world to come, and Californians in all parts of the State will welcome those who attend her exposition, and visit her mountains, valleys, and shores.

Believing that the stranger within California's gates is entitled not only to a cordial welcome and generous hospitality, but to such need of protection as lies within her power, the Woman's Board, more than a year ago, issued a call and organized a non-sectarian, non-political Travelers' Aid Society for the protection of the traveling public, particularly young women, girls and boys.

EFFECTIVE SERVICE

This organization rendered effective service during the pre-exposition period, and will endeavor during the exposition year and thereafter to protect and guide visitors upon

their arrival in San Francisco, or in the cities on the eastern shore of San Francisco Bay. A careful inspection and registration of reputable homes, boarding houses, and hotels has been under way for many months. All trains are met by expert Travelers' Aid workers, and those requiring protection will be carefully safeguarded.

The badge adopted by the Travelers' Aid Society of California is shown in its exact size and colors on another page.

LECTURE SERIES

Another department of work which has been far reaching in results is the series of exposition lectureries prepared by the publicity department of the Woman's Board, for school children. They have gone generally to the schools of this State, and many thousands are now being sent to school children of the other states. The preliminary preparation and supervision of the day nursery and children's playground has been entrusted by the exposition management to the Woman's Board, and little folk placed in our care will receive excellent mothering and expert attention. Altogether the activities of the women of California in connection with their exposition are varied and have been seriously undertaken.

“THE woman of tomorrow will not differ from the woman of yesterday in femininity or physique or capacity, in her charm for men, or in her love of children, but in response of her eternally feminine nature to a changed environment. Today woman is beginning to be educated for the new era, and man must go with her. She is learning home-making with new implements and new opportunities. She need no longer be a drudge and she must not continue to be a doll. The new mother, alert to the larger needs of her household, is more competent than her grandmother, and must even supplant ‘the tired businessman’ in municipal housekeeping until he can be her equal and himself deserve the suffrage.”—*Charles Zueblin*.

How the Woman's Board of the Exposition Differs Organically from Similar Auxiliaries

By Mrs. Gaillard Stoney

Secretary of Woman's Board

MRS. GAILLARD STONEY has served as secretary of the Woman's Board since the incorporation of that body. She is well known in San Francisco society as well as in the world of women's clubs and in church and charitable activities. She is the wife of one of San Francisco's prominent attorneys.—[EDITOR'S NOTE.]

THERE have been three great international expositions in America celebrating national events. The first was held in Philadelphia in 1876, and was known as the Centennial, which celebrated the birthday of our independence; the second was held in Chicago in 1893 and known as the World's Columbian Exposition, which celebrated the discovery of America; and the third was held at St. Louis in 1904, and celebrated the Louisiana Purchase, or in other words, the peaceful conquest of the West. The Panama-Pacific International Exposition is the first great exposition to celebrate an international event, the completion and opening of the Panama Canal.

Expositions more than anything else in the world show the progress of woman's work. At the Centennial in Philadelphia the woman's commission brought together the exhibits shown in the woman's department, raised funds necessary to build the Woman's Pavilion, suggested the department of public comfort, and originated and carried to completion other useful and practical ideas. But their work was infinitesimal

in comparison to what the board of lady managers accomplished at the World's Columbian Exposition at Chicago. That board was created by act of Congress, said act allowing them to appoint one or more members of all committees authorized to award prizes for exhibits which were produced in whole or in part by female labor. The board of lady managers numbered one hundred and fifteen members, who were appointed by the different state commissions, two women from each state, one a Democrat and the other a Republican. There were also nine members from the city of Chicago, appointed by the president of the World's Columbian Exposition commission. Provision was made for alternates. An appropriation of about \$150,000 was made for their expenses. The cost of the first meeting, which continued seven days, was \$18,000. The traveling expenses of the members of the board and their hotel expenses were paid out of the appropriation. A salary of \$5000 was allowed for the president, which she did not accept for herself, but paid it out for the services of a



Mrs. Gaillard Stoney

private secretary. The salary of the secretary was \$3000.

It was at the request of the board of lady managers that women for the first time were asked to be represented on state commissions. They organized a woman's dormitory association and built a dormitory with accommodations for more than a thousand women at a cost of about \$50,000, and it was a financial success.

BROAD SCOPE OF WOMAN'S WORK

They presented the broadest scope of woman's work in educational, professional, artistic, inventive and industrial fields. A most important duty was to secure a full representation of all the industries of women in the main exposition buildings. This was the first universal accumulation of woman's work, the preponderance being in manufactures, liberal arts and fine arts.

An appropriation of \$200,000 was made for a woman's building, which was designed by a young woman graduate of the Massachusetts Institute of Technology. It was the intention of the board to show that the women among all primitive peoples were the originators of most of the industrial arts, and it was not until these became lucrative that they were appropriated by men.

The following ten years show the most remarkable progress made by women in the history of the world and at the St. Louis exposition woman for the first time stood on an equality with man. Women were placed on the juries of awards; women sculptors and painters did some of the finest work exhibited; for the first time there were women concessionaires, and a woman contractor competed with men for the construction of a building. Woman had some part in the making of everything exhibited, except possibly in one or two departments of machinery. There was no separate woman's building, but the board had the use of a building of the Washington University, where it entertained. At the first meeting it passed a resolution asking the commission that it use the utmost care in awarding con-

cessions for "shows" in order that there might be no objectionable features, and this resolution was largely instrumental in lowering to a minimum the number of objectionable features on the Pike. Appointment of the board was by act of Congress and the members were appointed by the national commissioners from every section of the United States. The board of lady managers numbered twenty-four. It had an appropriation of \$100,000, but it returned about \$28,000 to the exposition company. It was allowed traveling expenses and \$10 a day for each member for subsistence while in attendance at meetings and on duty at the exposition. The women jurors were paid \$7 a day and traveling expenses. The principal work of the board of lady managers at the Louisiana exposition was entertaining the visitors and distinguished guests from all over the world.

MORAL SAFEGUARDING

The woman's board of the Panama-Pacific International Exposition was organized at the request of William H. Crocker, vice chairman of the Panama-Pacific International Exposition. There are thirty-six directors on the board and it is incorporated for \$25,000, it being obligatory upon each director to purchase at least five shares of stock at \$10 a share. It was made a sub-committee of the exposition directorate and agreed to raise \$200,000 for the furnishing and maintaining of the California Host Building, of which it was given entire control. Each director was taxed 50 cents a month for a flower fund for the purpose of sending flowers to official and distinguished visitors. The functions which have been given during the pre-exposition period have been entirely by subscription so that not a cent of the money raised was paid out for entertainment. The woman's board provided its own offices in the Exposition Building and, like the board of lady managers of the Louisiana exposition, the first thing it did was to ask the directors of the exposition that there would be no objec-

tionable features in the amusement concessions, and to plan for the moral safeguarding of the women and girls during the exposition year. The Travelers' Aid Society was organized by the woman's board. This work is receiving financial assistance from the woman's board and will be largely supported by them during the exposition. Already a number of the directors have contributed large sums of money, and subscribe \$5 a month. In addition there are to be women in uniform and without uniform on the grounds night and day, and President Moore under his own signature has said that this exposition stands for moral protection and will leave nothing undone to support its position.

The next work was to plan a way for raising, in addition to the sale of stock (no dividends and no liabilities!) the money needed for furnishing and maintaining the California Host Building, and the result was the formation of the county auxiliaries, with a chairman in each county, and sub-chairmen in each town and city, as associate directors of the woman's board, to co-operate and assist in being the hostesses. To offer an inducement to those who might not be otherwise interested to become members of the auxiliary, a part of the California Host Building was reserved as a tea room and a rest room for their exclusive use.

This is the status of the woman's board. From the thirty millions raised by the men of San Francisco and the counties and State of California, it has not received one cent.

It has given its time freely and its money liberally to stand by the men who made this exposition a success, and no one is receiving a cent in compensation. That is the spirit of the women of California!

Perhaps the crowning triumph of woman at this exposition is her recognition as assistants in the different departments of the exposition.

TO THE PIONEER MOTHER

The director of the fine arts department, Mr. J. E. D. Trask, was anxious to have something typical of California in the place of honor under the dome, and deeply pondering what it should be one day he met Mrs. Ella Sterling Mighels who told him of her plan for a monument to the Pioneer Mother. "That," Director Trask said, "is what we will have," and accordingly he asked the woman's board to form an association for the purpose of raising \$25,000 for a monument in bronze, to be afterwards placed in the civic center of San Francisco. Mr. Charles Grafly of Philadelphia is the sculptor. Mrs. Phoebe A. Hearst and Senator James D. Phelan were appointed a committee to visit Mr. Grafly's studio and pass final judgment on the monument. All the contributions have been in small sums, as it was the wish of the association to have every one in California contribute, and even the children in the public schools have given a penny subscription, the maximum sum asked for from them being 5 cents. This is the first monument to motherhood in the world.

“A WOMAN should deem it one of the grandest privileges of her sex that she can now help to choose the men who will make the laws under which her children must live, and exert her purer influence upon the political atmosphere of her time.”—*Cardinal Moran of Australia.*



Mrs. Marie Hicks Davidson

EDITOR'S NOTE: The task of compiling the material for the Woman's Section of this publication having devolved upon Mrs. Marie Hicks Davidson, she has displayed rare judgment and ability in completing it. It has been largely due to her extensive acquaintance with California's notable women, the result of wide newspaper experience, that she has been successful in obtaining representative contributions, covering a wide range of subjects. While, of course, no effort has been made at completeness, an obvious impossibility in such limited space, it may be said that if the list of contributors to this section does not include all the foremost women of the State, it does contain none but those who for one reason or another are entitled to highest honors from California. Mrs. Davidson is herself deeply interested in all those activities with which the modern woman concerns herself. She has owned and edited a newspaper, she was for a year a publicity writer on the Woman's Board of the Exposition; she is a short story writer of recognized ability, and she regards life and its duties with that clear but high-spirited vision that makes California women immediately recognizable throughout the world. Mrs. Davidson, it may be added, is permanently identified with *California's Magazine* and will edit the woman's department of this publication.



Mrs. Charles Farwell Edson

Woman's Part *in* Industrial Welfare Commission

By Mrs. Charles Farwell Edson

Member of the Commission

EDITOR'S NOTE: The Industrial Welfare Commission of California of which Judge Frank J. Murasky of San Francisco is chairman, is composed of five commissioners and a secretary. One of the five commissioners is a woman—Mrs. Charles Farwell Edson (Katharine Philips Edson) of Los Angeles—without whose name no roster of California's distinguished women would be complete. Mrs. Edson is now serving her second term as chairman of the social and industrial department of the California Federation of Women's Clubs. She is serving her third year as the woman member of the Council of the National Municipal League.

AS THE woman member of the Industrial Welfare Commission I will say that our aim is to provide a real living wage for the working women of the State and to safeguard the learners during their apprenticeship period so that they really may be taught a trade and not put into blind alley occupations, to be used and exploited and then thrown out unskilled and unprepared for life as it is. We hope to co-operate with our commissioner of vocational education and slowly try to develop in California an industrial condition that will be as much the envy of the other parts of the nation as is our glorious State in other respects—a pretty high ideal, but one worthy of any one's highest endeavors. California has succeeded in getting a well-enforced eight-hour law for women and children, a good child labor law, and one of the best workmen's compensation acts in the Union. Our commission hopes to supplement this work with the administration of our minimum wage law for women and minors so that we will help solve the serious industrial problem not only of our own State but also of the more highly complex industrial States of the East.

Playground Propaganda in California

By Miss Ethel Moore

President Board of Playground Directors of Oakland

MISS ETHEL MOORE, daughter of A. A. Moore, the distinguished attorney of Oakland and San Francisco, has done missionary work in the public playground movement for a number of years. She is a member of the Association of Collegiate Alumnae, a member of the California Federation of Women's Clubs, and was one of the most enthusiastic of the pioneer band who worked for suffrage in California.—[EDITOR'S NOTE.]

CALIFORNIA is frequently called "The playground of the nation," which means that on account of its climate it is a veritable Mecca for visitors. But there are few who realize how the natural recreation attractions of California are being developed for the benefit of our own permanent residents.

This was the first state to organize municipal recreation commissions, separate and distinct from any other office or part of the city government. The function of such a commission has been to promote every form of helpful exercise and wholesome enjoyment that would aid and abet in the use, rather than the abuse, of leisure.

Los Angeles, San Francisco, Oakland, Berkeley, Alameda, San Diego, Fresno, Stockton, Sacramento and Richmond have such commissions. Under their auspices are laid out and maintained public playgrounds, tennis courts, athletic fields, running tracks, baseball diamonds, summer camps. With trained leaders all manner of games are conducted, meets and tournaments held, clubs and classes, evening dances, chorals, theatricals, festivals and

pageants promoted. Boy Scouts and their hikes are encouraged, Camp Fire Girls and their ceremonials, women's outdoor clubs and their frolics. Nor are these activities confined to land. Boating and swimming are popular sports, and flying for the boys who own aeroplane models.

Thus in our towns and cities are we trying to counteract the tendency of the home to evolve into the apartment house type and the family into the one-child type. Moreover, with the shortening of the hours of labor the use of leisure becomes a problem the community must help the individual to solve.

That vigorous out-of-door play is as vital in the body-building of the child as light, food and air—that the social and moral effects of supervised sport are essential in the character making and the training for citizenship of our youth—and that new life, re-created in moments of hearty enjoyment, every man and woman must have—these are the principles that led to the appointment, after concurrent resolution of the last legislature, of a state commission of recreational inquiry.

To the present legislature of 1915 the result of this inquiry has been presented, and the report covers the whole field of recreational needs and opportunities. Our mountains and forests, moving pictures and skating rinks—no possibility is omitted. Many a constructive suggestion is included, on recreation for the insane, recreation for remote camps and other centers of industries, recreation for the country district,

and recreation as a substitute for the saloon. Such a survey will surely hasten the day in this State when all alike, young and old, may have every opportunity for that true recreation which means renewal of strength to meet the responsibilities of life. To quote Dr. Richard Cabot: "Work, play, love, worship—with these any life is happy despite sorrow and pain—successful despite bitter failure."



Women as Bankers in California

By Mrs. Phebe M. Rideout

Director of a Number of California Banks

ALTHOUGH banking is not an occupation for which women are especially fitted, there are of course among women, as among men, persons who either start with natural ability in financial matters, or fall heir to responsibilities which they must learn to carry, and carry successfully. Banking as a profession, it is needless to say, contains great interest and fascination.

Already women have shown themselves capable in this profession, for they are now doing good work as assistant cashiers, heads of students' departments, and the like. At present it may be doubted whether the general public would place so much confidence in a woman banker as in a man; and an equal confidence is precisely what women, as bankers, must learn to deserve. There is reason to think they can do so, as they have already done in other businesses.

MRS. RIDEOUT is a director in a number of banks in California, succeeding her late husband in the varied business interests in which he was engaged during the formative period of California's commercial and banking industries. She directs her business from her home in Washington Street, San Francisco.—

[EDITOR'S NOTE.]



Women's Part in University Extension Work

By Miss Nadine Crump

Secretary Bureau of Class Instruction and General Organizer U. of C. Extension Division

MISS CRUMP is a graduate of Radcliffe, the Harvard annex for women, and has been affiliated with educational work all her life. She is said to have found her forte in the work she is now pursuing at the University of California.—[EDITOR'S NOTE.]

IN INTELLECTUAL activities, the limitations are not fixed by sex. It so happened, however, that in university extension as in many other uplift movements women took the initiative, for this great democratic movement in education was begun at Cambridge, England, when to a group of women Mr. James Stuart made an address on the "Art of Education." When the English system was transplanted to America, it was before the American Library Association. At that time women had only a small part in the administration of libraries, but constituted then, as now, a large per cent of the patronage. The extension idea found in America a fertile soil, for there had been started here a new and powerful agent of popular education, the Chautauqua movement. Of those who formed the long lines that marched on Chautauqua Day, a large

proportion were women. In the establishment of the University of Chicago, university extension was for the first time made a department co-ordinate with other departments of the university, and sent its lectures and lessons to all parts of the country. It was women at the head of schools, and women committees everywhere, who welcomed for themselves and their communities this new educational opportunity. So it has been that in this movement to educate all of the people, woman was there in the beginning, and, in the carrying out of the work, she has done her large part both as patron and promoter.

California is one of nearly fifty colleges and universities now engaged in university extension work other than agriculture. It has been so engaged for many years, the work being done chiefly through courses of

lectures. In 1913 the work was organized under the name of university extension division. The present plan of administration is as follows: The division consists of two departments, one of instruction and one of public service. The department of instruction consists of three bureaus: The bureau of correspondence instruction, the bureau of class instruction and the bureau of lectures. The department of public service consists of two bureaus, one of public discussion and one of information and municipal reference. There is a secretary in charge of each of these five bureaus acting under a director of the division, who reports to the president and academic council.

PAST EXPERIMENTAL STAGE

After a half century, university extension teaching might be said to have passed the experimental stage. There are, however, still doubting Thomases. Some people, more of them found in the academic walks of life than elsewhere, are visibly shocked at the suggestion of a university giving instruction extra mural; the shock amounts almost to a nervous breakdown at the thought of offering any course not found in the regular curriculum. The tendency of those who live long in an academic atmosphere is to become divorced from life, to interpret its meaning in terms of units of credit and degrees, and to make the course of study not only the end rather than the means, but to regard it with such reverence as to consider any attempt to add to or subtract therefrom as highly and harmfully iconoclastic. In the words of the old song they believe

It was good for our fathers,
It is good enough for me.

This state of mind is a natural result of their conception that a university is a place where only the favored few may spend time in the pursuit of knowledge. Their faces are turned backward to the old ideals of a university, which by the pursuit of abstract truth trained men's minds but did not prepare them in any specific way for the duties

of life unless the duty lay in following one of the so-called learned professions.

A state university is an institution established by the people, and supported by the people for the purpose of raising the standard of its citizenship. This it has been doing by furnishing instruction for students on the campus. If it stops there, it fails in its opportunity and in its duty, for a very small per cent ever reach the campus. Better conceive a state university as a source of information and inspiration to which all the people may turn in time of need.

How well this can be done is illustrated by the work done in agricultural extension. It is but a few years since the agricultural college was spoken of in terms more or less derisive. If a boy did not fit well into the established course in high school, he left and went to the agricultural college, and the report of such transference of allegiance was always spoken of as if he had chosen the second best. But when it was learned that the "cow college" even in its short courses bore a direct result in increased wealth to the individual and the state, there began a change in the attitude toward it. When Farmer Jones learned that if either his hog or his alfalfa was sick, he had the services of a free clinic at the university, he began to feel that after all the university was not an institution to be financially fathered by the state for somewhat the same reason it fathered the reformatories and the asylums, but as an institution that bore a vital relation to his life and that of his neighbors. So when he or his neighbor went to the legislature, he made it his business to see that the money was appropriated for agricultural teaching.

NEEDS DIFFER

Farmer Jones's need was one thing; that of the young woman in the Spanish class was another. By doing general housework for thirteen years, her mother had kept her in school until she had finished a course in the commercial high school. To perfect herself for a secretarial position, she needed some

courses in Spanish. Attendance upon classes at the university or private instruction were both prohibitive, but she could afford while holding her first position as stenographer to attend an extension class.

At the present time, plans are forming to organize a class mainly for teachers whose lots have fallen in a place barren of opportunities for amusement or instruction. Through the university extension such opportunities may be offered them as will enrich their own lines and make them more valuable to their profession. Some of these might not feel entirely at home in the campus class rooms, some of which are not always "wells of English undefiled," where pretty girls speak of a "dandy major" or "a peach of a p. g." but somehow manage to struggle along, confining themselves only to the simpler forms of their mother tongue. One of the most interesting and earnest extension classes being conducted at the present time is one in elementary electrical engineering. The class is composed of men under thirty. Most of them left school before entering high school or just after, to take up a trade. They are holding positions with an electrical company but have gone as far as they can without more technical knowledge. On the night the class meets one finds them in groups studying long before the hour of recitation. Their need and their desire is to increase their knowledge, that they may increase their efficiency. No one can well deny that in providing instruction for these an institution supported by the state is not within the limits of its duty.

The university is not always the one to play the part of Lady Bountiful. It has not learned how well it may be served in matters of knowledge by the people. It goes to great trouble and expense to secure historical documents for its library and specimens for its museum, but is indifferent to the great fund of information gathered from experience and stored up in the minds of the living. It was a pioneer farmer who called the attention of specialists in the Col-

lege of Agriculture to the fact that in the zeal for land development great harm was being done; that the cutting away of the underbrush prevented the accumulation of water in the natural reservoirs, and hence resulted in great loss to irrigation. In this day of improving conditions of country life, a great deal of attention has been given to the problem of the septic tank. Some have been offered the country folk that would not only take a Philadelphia lawyer to explain, but a Philadelphia banker to purchase. A farmer, I am informed, has invented one so simple that any one can install it and at a cost of only \$25. When a university has made its perfect adjustment, it will not only be furnishing instruction, but receiving it, drawing force from the people, highest, humblest, all, and then sending it out again to all who can make use of it.

In the eighteen months since the work of the general extension division was begun in California, 146 courses have been offered by correspondence. Up to date the registration for these courses is 2677. In addition to this, definite instruction has been offered through class instruction. Wherever, within a distance not too remote from the university, a sufficient number of people desire to study the same subject, a class is formed to which an instructor is sent. One hundred and fifteen classes have been formed and more than 1600 persons have received instruction in this manner.

Who are the people doing this work and what courses are they taking? The students are from almost every walk in life. There are men and women of leisure who desire study for its own sake, among whom are many who have college degrees. There are those who could not pass the entrance examination but whose earnestness and maturity enable them to pursue the work with profit. Some of the courses offered are the same as in the university and carry university credit. Whenever such is the case, there is no lowering of the standard, either in the quantity or in the quality of work.

The subjects taught have been: English composition and literature, commercial and parliamentary law, public speaking, German, French, Spanish; engineering—elementary electrical; stenography and typewriting, auditing, domestic art, history, education, political science, economics, and banking.

The greatest demand for instruction in classes has been for French and Spanish. In San Francisco and Oakland alone, 547 people have been studying one or both of those languages. Some work of great promise is being done both by correspondence and in classes. The classes in English range from elementary composition to those who have won some distinction in literature. In some extension classes are those who have their master's degree and who attest their scholarship and prove their allegiance to their academic training by insisting upon the very latest in bibliographies.

A NEW VIEWPOINT

An interesting feature of the extension work is the demonstration that the university has caught the new viewpoint in regard to prison administration and is carrying instruction into the prison cells. Six hundred and ninety-five men at Folsom and San Quentin are taking correspondence courses. In addition to that number 593 are being taught in classes by men who go to the prisons at stated times to give the instruction.

Another form of instruction is by means of lectures. Since the organization of this division, 47 lecture courses and 150 lectures have been placed. These have been on history, political science, art, education and literature. When the war broke out, there came a demand for instruction on the European situation. To meet that a lecture course was planned which has been placed in thirteen cities and towns in the State.

This is suggestive of the method by which extension work is carried on. It is trying to avoid the mistakes made by the public schools and the universities in framing a course of study based on traditional ideas in the belief that it was adequate to the

needs of modern society. The university has no preconceived notion of what a community should have. It endeavors to canvass situations, crystallize interest, and provide such instruction as is needed and desired. If a sufficient number in any locality thirst for further instruction on the final e in Chaucer, that instruction will be given, but if Susie Smith and her friends prefer spending an hour not at the movies nor the dance hall, but in listening to a lecture on the literature of California, her wishes are respected and the university endeavors to provide the instruction.

LECTURE FIELD LARGE

There is a larger field for service through the lecture work than may be supposed. One small city in the State has this year supported a lyceum course that cost the citizens about \$1000. So generously have the people supported it that the largest auditorium in the town is not large enough to accommodate the subscribers should they all decide to be present at the same performance. This, however, does not happen, for with the fine community spirit that characterizes the place many have subscribed who never attend. At the close of the lyceum course this spring the committee placed a university extension course to satisfy some who desired mental food other than that furnished by the lyceum course, and with a conscious effort to raise the standard of entertainment. There are many such communities and here is a great opportunity for the university. The university go into the lyceum business? Even so, until we hear no more of lyceum bureaus exploiting both entertainer and community for a high profit for themselves. If the plans of the management of university extension are carried out, the moving picture show will have a competitor that will force it to retire from business or raise its standard. The desire of the extension division is to establish a bureau of visual instruction which will collect and loan slides on all subjects of educational value. These will be sent free of charge to all parts of the State.

In addition to these bureaus of instruction, there are two bureaus of public service, the bureau of public discussion and the bureau of municipal reference. The bureau of public discussion is established for the purpose of stimulating and directing the interest of the people in vital questions. A very important work by this bureau has been done this year in organizing a State debating league. The bureau of municipal reference devotes itself particularly to municipal problems, aiding municipalities in solving the many vexing questions that confront them in this day of reform in city government. If the question, for instance, is a new charter, street paving, public amusement, impartial and reliable information can be had at the university and elsewhere. It is the aim of the secretary of this bureau to put this information at the disposal of the individual or the municipality desiring it.

It is desired not only to make all extension work valuable and interesting, but continuous, and to that end encouragement and assistance are given in organizing permanent centers. Centers have been formed in Fruitvale, Fresno, Sacramento and Redlands. In these places people interested in advancing the intellectual life of the community come together and organize in a very simple manner, with a president, a secretary, and a local committee. The fee for membership is fixed, by means of which a fund is created with which to carry on the work. Stockton is practically a center, as it has been a generous patron of extension lecture courses, and has maintained a large class in the study of literature, now entering on its third course of lessons. The Los Angeles Teachers' Club has for a long time made university extension lecture courses a regular part of its programme, with many doing the study connected with it.

In San Francisco the work is largely centralized at the Underwood Building where, through the courtesy of the regents of the Hastings College of Law, the extension division has the use of the rooms of the col-

lege in the afternoons and evenings. During the past semester twenty-two classes have met there. Such is the plan of the university extension work as it is being carried on. Such is a brief report of the accomplishment of the first few months, so far as it can be made in statistics.

In this work, what part have women had? In the department of administration there is one woman. Of the total number who have taken instruction, 3425, 1670, almost one-half, have been women. These figures indicate that the women of the State are as eager as the men for individual improvement and advancement. The connection, however, which women in groups have made to the university has been very inconsequential. Of the forty-eight lecture courses placed in the State, the Woman's Club of San Bernardino has the distinction of being the only woman's club to assume entire responsibility for a course; of the 150 lectures placed, Ebell of Los Angeles became the patroness for one lecture, the only woman's club to assume such responsibility.

It is a significant and interesting fact that with the opening of the door of greater political opportunities came this new opportunity for women to prepare themselves for their greater political duties. It has been hoped that the women's clubs would incorporate into their programmes some definite line of study directed by the university, and to that end some courses have been planned. With the opening of the Panama Canal there is no more vital question to Californians than the immigration question. With the desire to help those who wished to be informed, a course on the subject has been offered. Courses on other subjects of equal interest have been planned. The women of California are a great army. In the federated clubs alone, with their 33,000 membership, lies a tremendous influence for good in the social and political life of the State. It is the desire of the university to serve them and all other citizens in any capacity that will make for a higher standard of citizenship.

Education *for* Young Women in California

By Miss Hettie B. Ege

WRITERS on the early days of California tell us that shortly after the discovery of gold on the Pacific Coast great need was felt for educational opportunities for the children of the pioneers, and particularly for the girls of those days. An immediate response to this need was made in the little town of Benicia. Here, in the fall of 1852, a boarding and day school for girls and young women was opened. This school was a connecting link between the East and the Far West, as its first teacher, Miss Susan A. Lord, came from Boston. After a few years the school was purchased by Miss Mary Atkins of Cincinnati, who increased the scope of its work, and administered its affairs ably for thirteen years. Then the school again changed hands, having been purchased in 1865 by Doctor and Mrs. Cyrus T. Mills. Dr. Mills was an alumnus of Williams College and had come under the stimulating influence of that wonderful leader, Mark Hopkins. Mrs. Mills was graduated from Mount Holyoke Seminary and for some years after graduation was associated with Mary Lyon as a teacher. The name of the school was now changed to Mills Seminary and was continued at Benicia for six years longer. The question had arisen regarding removal to some locality which was developing more rapidly than Benicia and which would offer the students more advantages. It was transferred accordingly to the suburbs of Oakland in the beautiful foothills of this region where a tract of 150 acres was purchased. It continued with approximately the same course of study for some years.

Mills Seminary had been deeded in 1877 to a board of trustees having been incorporated under the laws of the State, and it is to be held in trust by these trustees and their successors forever. The purpose of the institution was understood to be that of educating young women. By the terms of the gift it is to be Christian in character but not sectarian, and "students of every faith are to be made welcome."

Doctor Mills's death occurred in the spring of 1884. He had been prominent not only as an educator but as a man of business affairs. It was said of him that he was entitled to a place among the educational benefactors of the State, and that he had enriched the public. The people of Pomona, where he had certain business interests, wrote at the time of his death: "He made the unknown town of Pomona waken, and grow, and bloom, and blossom, and waft the perfume of its orange blossoms throughout all the states." The school up to this time had accomplished much fine work for the young women of that day. Among its graduates are women of prominence in the State—women who have served and are serving successfully on boards of education; those who have been prominent in church and missionary work; leaders in welfare work, hospitals, and social service; home makers and teachers.

It had been the plan of Doctor and Mrs. Mills to enlarge the curriculum of their school. In 1885 this was done, a college charter was granted by the State, the name was changed to Mills College and Seminary,



Miss Hettie B. Ege

Dean of the Faculty and Acting President of Mills College

MISS HETTIE EGE is dean of the faculty of Mills College, and in that capacity is virtually the president of the institution, since no president has been named since the administration of Dr. Luella Clay Carson. Miss Ege has been connected with Mills for many years, and is generally beloved by students and graduates of the college. She enjoys the esteem of educators all over the world. Since Mills is to California what Wellesley is to the East, it is most apparent that the leading spirit of the institution is a dominant figure in the educational activities of the State.—[EDITOR'S NOTE.]

and Mills College was authorized to confer degrees upon its graduates. The two departments of college and seminary were carried on together until 1911, when the last seminary class was graduated.

Upon the death of Doctor Mills, Mrs. Mills became president. In 1909 she resigned this office and Miss Luella Clay Carson of the State University of Oregon succeeded her. Miss Carson filled the position until 1914.

A REMARKABLE WOMAN

Mrs. Mills, whose death occurred in 1912, was a woman of executive ability, of remarkable courage, and great breadth of sympathy. Many California women testify to her helpful and lasting influence upon their lives.

During the past six years Mills College has strengthened and broadened its curriculum and has made its entrance requirements more rigid, so that they now are equivalent to the requirements for entrance to the State University. Graduates of the college are doing creditable post-graduate work in different universities, taking their second degree in one year after graduation. The so-called standard departments are included in the curriculum; attention, however, is being given to such subjects as changes in the social order from time to time demand, and due emphasis is placed upon those fields of work in which women are becoming increasingly interested and in which they play a large role. In California, where the opportunity for outdoor life is so great and where the public playground is being so well developed, there arises a demand for trained workers in this line; accordingly the college has enlarged its department of physical education and students are now majoring in this subject. The gymnasium is comparatively new and well equipped; there are courts for tennis and basketball on the campus. Students row on Lake Merritt, which is within easy reach of the college. The completion

of this course fits graduates as teachers of gymnasium work in the schools or as playground directors.

After finishing a four-years course in the home economics department, graduates are appointed to positions in high schools. The factories, shops and refineries of San Francisco and its environs offer opportunity for field work. The schools of Oakland are available for practice teaching in home economics, physical training, and for student investigation in child psychology. The settlements, juvenile court, in some of its phases, the civic leagues, the meetings of the Associated Charities, in the neighboring cities, are open to the students of sociology for investigation and observation.

The college offers good opportunities for the study of the theory and practice of music, and for the history and practice of art.

GIVE ANNUAL PLAY

Under the auspices of the English department an annual play is given; recent productions have been: Ben Jonson's "Sad Shepherd"; "Much Ado About Nothing"; Mackaye's "Canterbury Pilgrims," and Yeats's "Countess Cathleen." There is also an annual May Day fete, at which the physical education department presents a pageant.

The student body maintains the usual college institutions and organizations: Self government, the Young Women's Christian Association, the athletic association, the walking club, the rowing crew. A student council made up of representatives elected from the various classes confers with the student affairs committee of the faculty on extra-academic matters. The students uphold the Mills College tradition of attendance at morning chapel and church service.

Mills College aims to equip young women for efficiency in the home and in the world, for carrying into life the spirit of co-operation and unselfish service.



Work of the Commissioner of Elementary Schools

By Miss Margaret E.
Schallenberger

*Commissioner Elementary Schools of
California*

MARGARET E. SCHALLENBERGER, commissioner of elementary schools of California, was born on the ranch, which is still her home, in Santa Clara Valley. Educated in childhood in an ungraded country school, she entered at fourteen the San Jose State Normal School. Upon graduation she taught first in rural schools of the State, later in the city schools of San Jose, and after five years of service there, in the normal school from which she had been graduated. At the end of her first year of principalship of the normal training school she became instructor in the Leland Stanford Jr. University. Miss Schallenberger is a graduate of Stanford University and also of Cornell University, receiving from the last named institution the degree of doctor of philosophy. She is a member of the Phi Beta Kappa and of Sigma Xi honor societies. She has lived a life of varied experiences, years of which have been devoted to the training of teachers for the elementary schools. She has lived much with children and has kept in close touch with rural life conditions. Her life history, undoubtedly, has much to do with her efficiency as commissioner of elementary schools of the State.—[EDITOR'S NOTE.]

TO OUTLINE clearly and concretely, in an article as brief as this of necessity must be, the nature and scope of my work during the past year, would be impossible. I shall attempt, therefore, merely to give a few facts concerning the creation

of the office of commissioner of elementary schools of California and to state some of the elementary school conditions toward which the work of the office has been and is being directed.

The elementary teachers of the State of

California number 12,266. Variation in the efficiency of the schools taught by these teachers is marked. Therefore equal opportunity is not provided for all the children of the State.

State superintendents, county and city superintendents, members of boards of education, faculties of State normal schools, and professors in the departments of education of the University of California and of Leland Stanford Junior University have each and all proved their worth in aiding in the direction and supervision of the work of elementary education, but the activities of each and all are limited by manifold and increasing duties and interests, some of which lead away from, rather than toward, much that is of vital importance to the elementary schools.

The enactment of a law, therefore, approved June 6, 1913, providing for the employment of an official to be known and designated as the commissioner of elementary schools, committed to work in the interests of this particular field of education, who shall visit the elementary day and evening schools of the several counties of the State, investigate the courses of study, report his findings and make recommendations to the State board of education, was virtually a recognition by the people of the necessity for more and special attention to the elementary schools; and the wording of the law defining the duties of the office imposed an inferred obligation on the part of the State officer employed to use continually all possible diligence and effort in bringing about action for the improvement of these schools.

This did not mean that the commissioner was to work alone, unaided by those co-operative agencies which have proved and are proving extremely valuable, but rather that with and through these agencies and others which might be brought into action, the central State office might be instrumental in strengthening, enriching and unifying the elementary school system to the

end that it might more completely serve the interests of the State.

With this understanding of the meaning and function of the office, I entered upon my duties January 1, 1914.

ELEMENTARY SCHOOL CONDITIONS

So important have been the changes wrought by discoveries in science, so varied and complex are the life occupations, the interests and the means of service of the people, that the ideals and functions of the elementary school of today are quite unlike those of twenty or even ten years ago. Education is no longer the acquirement of a body of facts, but is dynamic in character, being carried on by means of various life experiences; and the problem before educators today is the determination of the value of these experiences. The laws of psychology, sociology, hygiene and ethics, therefore, are studied eagerly by the progressive teacher. The child must be taught to live sanely and must, through concrete experiences, become imbued with right ideas concerning the necessity for the support of himself and of others. At the same time appreciation of music, of art, and of literature are recognized also as valuable life experiences.

Love of nature and command of nature's forces are both to be attained. Honor and loyalty, unselfishness, courage, diligence, thrift, generosity, the feelings of mercy, pity, brotherly love, and desire for service, to be taught, must be experienced. Opportunities must be given for these experiences. The two great forces conditioning all lives are heredity and environment. Each human being is what he is through and by means of heredity and environment, not what he would have been had his environment been different. Absolutely essential for the planning of his early education is the study by the teacher of the conditions under which the child's life experiences are in operation, and the determination of what those conditions ought to be is the modern educator's problem. Moreover, the school is

truly performing its service only when it projects its efficiency into the home and makes possible the continuation of activities inaugurated but only partly carried out in the school.

Since the direction for the whole range of his life's activities is given to the child in the elementary school, the experiences planned for him there are of vital importance, and to be right, need certain provisions.

The state should provide good teachers. No teacher can be too well educated for work in the elementary school. Books no longer are the only tools of the elementary teacher. She must not only understand just what she is trying to accomplish through their use when they are used, but she must be able to lead the child into many an avenue to which no book provides an entrance. High standards of teaching qualifications for the teachers mean right life experiences for the citizens of the state, for the child's school experiences are truly a part, and a very important part, of his life experiences.

Expert supervision of these teachers is imperative. No individual in any field of activity who works alone, receiving neither help, suggestion nor recognition, does his best work.

Sanitary school buildings and school grounds, with room for play, comfortable and sanitary furniture, as beautiful, too, as

may be, should be provided. The physical well-being of the state's citizens demands the former and their aesthetic appreciation as consumers the latter.

School and home gardens should flourish, much work of all kinds should be done with the hands; habits of thrift should be inculcated; libraries, that the library habit may function, should be in evidence.

Schools are often benefited by various influences which are brought to them by the people as the result of social, economic, ethical, scientific, and artistic development. Among them are the moving picture, the phonograph, and the school savings bank. I have observed these agencies operating effectively in the elementary schools and believe that they well deserve the careful consideration of all teachers as direct educational agencies.

All of these and many other conditions offer opportunities by means of which our citizens will learn to find themselves.

Each child is a unit different from all other children, yet all children are alike. Mind patterns are different, mind material is common. With the state itself lies the responsibility of providing the conditions under which a system of education may be wrought out sufficiently simple to be the same for all the children, yet sufficiently complex to give each different unit his unique opportunities.

“FOR every wise man knows that one of the things most worth while is to command the active, willing, and intelligent co-operation of women in the management of human affairs. He must have it. There is no price, consistent with human progress and the persistence of humanity, that is too great for him to pay for it.”—*E. S. Martin.*

The California Federation of Women's Clubs

By Mrs. J. W. Orr

Past President of Federation



*T*HERE are certain names which suggest themselves to a well-informed mind when different subjects are discussed. When the theme is "Women's Clubs" in California, the names of Mrs. J. W. Orr, Mrs. Lovell White, and Mrs. Aylett Cotton flash at once into the consciousness of one familiar with the history of the club movement in San Francisco.

Mrs. Orr has been president of the California Club, the pioneer civic club of women in San Francisco, and has held all the offices of succession in the California Federation, and is therefore quite capable of discussing the federation from any point of view. An intimate and sympathetic knowledge of the federation and an official connection covering several years are the material basis for the following article.—[EDITOR'S NOTE.]

THE California Federation was organized in 1900 in the city of Los Angeles as the result of concerted action on the part of representatives from the literary, social and civic clubs of the State.

California but followed in the footsteps of other states similarly organized. State federation was a necessary corollary to national federation, as an effective means of disseminating the plans, programme and

general recommendations of the executive body of the General Federation of Women's Clubs.

Be it known that system prevails in the direction of the club movement. The national motto is, "Unity in Diversity." California's motto is, "Strength United Is Stronger." Departments of work approved by the general federation virtually become the programme of every state federation, and these cover every phase of activity in club life, for the standard of the federation and the policy of the individual club are one and inseparable. The subjects presented are quite inclusive; side by side with our educational and civic work are carried on the literary, artistic and musical studies which first brought women together in clubs. We have found it not incompatible to combine personal culture and participation in public activities.

Julia Ward Howe said, somewhere and some time, that "the women's clubs were a reserved force." In the evolution of society that reserved force has become released and is finding its best expression and doing its best work in the federation of clubs. Biennial conventions for the general federation, annual conventions for the state, and district conventions within the State—California has six—bring us together for conference, comparison, suggestion and recommendation, and the result is a mutuality of interests and a fellowship of service.

UNITY OF EFFORT

Federation means organization, unity of effort and diversity of interest, efficiency in planning and directing, the stimulation of fellowship, the cultivation of a tolerant outlook, the advantage of co-operation, a dignified avenue of expression and service, definite ways and means to create and influence public opinion, a continuity of effort that brings results, opportunity to develop the most powerful force in the world, personality.

It relates the woman to the group or club, the club to the state, and the state to the sis-

terhood of states in the federation. Our numerical strength in the United States is a million club women in more than six thousand clubs. In California approximately thirty thousand club women in four hundred clubs.

Organization has given us strength, power and place. Publicity has induced a wholesome realization of aggregate responsibility, and tempered the natural feminine tendency toward "direct action."

The business of being a club woman means that we must be informed of what is new and vital in the social or common thought of the day; what the ideals are which lead; what possible activities are advisable; what compromises are inevitable, and what general policy shall prevail. We must constantly seek our ethical, social, and political adjustments.

The door lately opened to California women gives upon a new vista. The state federation must now take into account the added power of women's political equality.

NO PARTISAN PROGRAMME

We have no partisan programme or affiliations, nor do we advocate the cause of any special interest, but we are concerned with the advance of education, with the betterment of social and industrial conditions, with the conservation of the child, with the preservation of our natural resources, with questions of public health and morals, and with the eternal warfare against war.

That these are political questions at bottom, and that we reach results through the machinery of politics, in no way reflects upon the integrity of the federation as a non-sectarian, non-political organization.

It is woman's nature to love and serve in the interests of the home. The federation takes women in the mass and uses their potential motherliness in the cause of humanity, uses this "released power" to establish in institutions and embody in the laws and statutes of the commonwealth, remedial measures which shall safeguard all

homes and all children, to the end of a better and finer social life.

The average club woman is a wife and mother, with average education, ability, attainments and leisure. The federation unites this good, average human material to some common human need.

WOMEN AS LEADERS

It is conceded that women are assuming leadership in matters of public welfare. It is necessary that leadership should be intelligent and sympathetic, and have the long view on human institutions. This is our task, "so to be disciplined to a larger vision." The federation in its wider reach rests upon the altruism of the average woman "concerned about many things."

What has the California federation done?

Encouraged the organization of clubs in every county and community in California. Established a community of effort and reciprocity in service and sociability. Standardized study programmes in literature, art and music. Directed civic work in the interests of cleanliness and beauty. Introduced tree planting in highways and byways, and safeguarded the purity of streams. Studied and indorsed the national plan for the conservation of waters and forests. Initiated protective and remedial legislation. Is committed to the extension of woman suffrage. Co-operated with all associations of men and women whose social ideals are in accord. Finally, as a great institutional body, we stand for Peace and Progress.

"THE daughters of California have a noticeable alertness and independence of mind. One reason, at least, for this is found in their pioneer heredity. The pioneer is always a person of energy and resource. In his first-hand struggle with difficulties his energies are aroused into glowing life. . . . The California woman in any walk of life meets fate with a high heart and a fearless spirit. . . . Conditions of fortune and climate and temperature all working together, have brought out a notable originality in woman's work on the Pacific Coast."—*Edwin Markham in "California the Wonderful."*



A Woman in the Office of Receiver of Public Moneys

By Mrs. Grace
Blackwell Caukin

Receiver of Public Moneys

MRS. CAUKIN'S appointment to the receivership in San Francisco of the public moneys was a reward from the present administration at Washington for her services in organization and her executive ability. Since her appointment there has never been any doubt in the minds of her male associates in the customs house of San Francisco as to her mental equipment, as the affairs of the office are conducted with clock-like precision and accuracy and without friction or confusion.—[EDITOR'S NOTE.]

WOMEN have, here and there, made a success of farming and cattle raising, but as yet are new in this work. When they realize that there is independence and happiness in farm life—especially community farm life—they will put their energies into it. A married woman, unless she is head of the family, can not homestead land; but there are groups of independent women who could, by filing on claims situated closely together, make a success. No woman should undertake an isolated country life alone.

Uncle Sam has land to give away, almost for the asking and for the effort one is willing to put onto it, and it is a pleasure to be able to do work which is bringing contentment and happiness to people who have longed for a small start in the country, but through no fault of their own have been unable to reach the exorbitant prices charged

in this State. There are many tracts of land still open, some of which will prove most excellent opportunities.

When a man or woman comes to the Land Office, with but a vague idea of the system of finding and filing a homestead, with the longing to better themselves the strongest idea, it requires the best service one can give. In this department, as in every other, the idea of service comes first. Mr. Lane, the secretary, is an inspiration to the entire working force of the Interior Department.

In the many other federal departments it seems to me the work is more automatic; collecting income taxes and fixing customs duties lack the ideals which are so necessary to successful work in the land department. And if one is looking for romance, where better can it be found than in the lives of those who represent the pioneer spirit of the present time?

The San Francisco Center of the California Civic League

By Mrs. A. E. Graupner

*M*RS. A. E. GRAUPNER (Elise W.) has been a prominent figure in club affairs and suffrage campaigning in San Francisco for a number of years, but none of her public work has ever swerved her allegiance from the delightful home over which she presides as wife and mother in Jackson Street, San Francisco. Mrs. Graupner has been particularly active in the Collegiate Alumnae and the "San Francisco Center," of which she writes below.—[EDITOR'S NOTE.]

THE San Francisco center of the California Civic League was founded by the College Equal Suffrage League, immediately after suffrage was granted to the women of the State, in October of 1911.

According to its constitution, the purpose is to unite its members in non-partisan educational and civic work. The open forum, as maintained by the center, affords the opportunity for discussion of public questions of general interest.

A basic principle of center meetings is that both or all sides of live public questions shall be presented. The large attendance at the frequent events, including luncheons, dinners, and headquarters meetings, indicates the success of the organization in stimulating an interest in public questions, both political and economic.

The membership roll is approximately one thousand, including persons of all political parties. From time to time distinguished members of the several parties have spoken before the center, including Governor Hiram Johnson, Senator La Follette, Secretary of the Navy Daniels, Secretary of the Interior Franklin K. Lane, and Secretary of State William Jennings Bryan.

The work of the center has been not only of a general educational character, but has

extended to specific efforts in behalf of the State and city's welfare.

Active interest in the work of the board of health, in relation to the city housing conditions, caused the center to urge the appointment of Mr. Lawrence Arnstein on that board. Mayor Rolph appreciated the value of the suggestion and accordingly asked Mr. Arnstein to fill a vacancy.

The activity of the housing section led the center to add the weight of its influence towards securing an amendment to the State housing law, making possible compulsory alterations of tenements with windowless or dark bedrooms. This will help to save the city of the future from all the sordidness of tenement districts.

Through the housewives' department the center secured the co-operation of the State dairy bureau, the State veterinary department and the Milk Improvement Association in issuing a call for a conference on State milk legislation. The conference was housed by the University of California through the courtesy of Dean Thomas Forsyth Hunt of the College of Agriculture. Both the university and the Federal Department of Agriculture sent representatives to act in an advisory capacity.

The conference was attended by repre-

sentatives of both producer and consumer.

A legislative committee was appointed, with instructions to draft legislation looking toward improvement in the general milk supply. As a consequence a bill has been drawn defining and standardizing pasteurization. The committee looks forward to the day when all milk sold in the State of California will be either certified or pasteurized.

The referendum on the red light abatement act was supported by a strong center committee previous to the November election. Thus the organization lent its support to the attempt to minimize the vice of commercialized prostitution in the State.

In January, 1913, the center became interested in the possibility of developing some form of social insurance for widows. As a consequence of this interest a bill passed the legislature calling for the appointment of a commission to investigate the whole question.

In naming the commission Governor Johnson appointed Miss Katharine Felton, one of our members, to fill one of the five places.

Believing that woman's point of view is always valuable, the center urged the trus-

tees of the Public Library to fill a vacancy in their board from the ranks of the many intellectual and public-spirited women of the community. The request was granted by the appointment of Miss Laura McKinstry to a place on the library board.

The interests and activities of the San Francisco center of the California Civic League are thus shown to be manifold. A full account would necessarily be too long for the space allotted. It will be seen, however, that education and service are the guiding principles.

Believing that her general experience in public health work would add strength to the State board of health, the center urged upon Governor Hiram W. Johnson and secured the appointment to that board of Doctor Adelaide Brown of San Francisco. The indorsement and co-operation of individuals and organizations interested in public health work throughout the State was given the center in its effort. So general was the interest in securing the appointment of a woman so well equipped for the work that all geographical considerations were waived in asking this appointment.

“IT IS ABSURD that woman should be considered inferior to man from a political standpoint. In these days most questions are settled by popular opinion. Why, then, should the saner—certainly the soberer—half of humanity be silent? It is neither reasonable nor logical.”—*Lucie Felix Faure.*

California Civic League

By Miss Maybelle L. Feusier

Chairman Publicity Committee California Civic League

MISS FEUSIER is chairman of the publicity committee of the California Civic League. She is a member of the Mills Club and of other women's organizations in San Francisco.—[EDITOR'S NOTE.]

WHETHER the epoch creates great men or great men create the epoch may remain debatable, but this at least is proven: When the need arose for the newly enfranchised women of California to study civic problems, there immediately arose an organization to meet that need. The California Civic League, state-wide in its scope, was created to educate women in citizenship and to guide them in supporting and promoting desirable legislation. It accomplishes this through study and service, service alike to the individual citizen and to the community. It enters into no partisan politics for it supports measures and not men. It draws its membership from all parties, from all classes and from all religious denominations,—one more proof of the eternal democracy of American institutions.

The California Civic League is composed of centers or branches and of an executive State board. The centers, thirty-six in number at the present time, are scattered throughout various cities and towns of the State. No group of women desiring to educate themselves in civic matters is too small to form the nucleus of a center. The smallest today is composed of thirteen members, the largest, in San Francisco, has over one thousand members. The centers are as independent of one another as are the states of the Union, but all are linked in a common bond through the State board. Each

center determines its policy in regard to the problems of its community, but on questions of state-wide interest the executive board, after submitting a referendum to its centers, determines the policy to be pursued, which sometimes involves the initiating of legislation. In such cases there is, manifestly, a large body of active women throughout the State supporting these measures and educating their communities to the need and wisdom of them. It is precisely this responsive co-operation that gives the organization its strength.

During the three and a half years of its existence, the California Civic League has issued syllabi on thirteen subjects. These syllabi are prepared by the highest type of experts and as they deal exclusively with facts, they form the "text book" for the centers in their study of the problems involved. They are essentially educational. They have included such a scope of topics as citizenship, voting and registration, party convention and primary systems, organization of the California legislature, the unprotected girl, causes and conditions of the social evil, business aspect of the social evil, prevention and remedy of the social evil, milk inspection, the jury system, the feeble minded in California.

TRAINED SPEAKERS SENT

Upon the most vital subjects, speakers are trained and sent to all parts of the State

wherever there is a call for them or wherever an audience can be assembled. This is the method of creating an enlightened public opinion, by educating all who are willing to listen; and as the California Civic League undertakes nothing which in its judgment is not just, needful and the time propitious, it has never failed to work without fruitful results. When the time does not seem propitious, it devotes its energies to a campaign of education, leaving legislation for the future. But it never unhitches its wagon from the star.

Its executive board is composed of women who give unsparingly of their time, their good effort and their wisdom. Honor without service is not within its fold. Miss Charlotte Anita Whitney, one of the founders of the organization, was its first president, and Miss Julia George now guides the helm with admirable skill.

The permanent headquarters is located in the Phelan Building, San Francisco.

The centers, in addition to their co-operation with the State board, do most valuable work in their separate communities. But perhaps to the woman, community will always mean environment for her boy and girl. It is consistent then to see her energies directed towards securing playgrounds, lighting parks, obtaining medical inspection in schools, organizing sanitation campaigns with investigations of dairies, bakeries and markets. It is consistent to see her entering protests against notorious road-houses, against an over-abundance of saloons, against law-breaking gambling halls—and knowing no compromise till her purpose is accomplished. It is consistent to see her having the curfew laws enforced, raising funds for manual training classes, establishing gymnasiums, voting bonds for better school facilities—and all these are the things she has done.

So here, where experience has demonstrated that to the woman, community primarily means environment for her boy and girl, there has been belied that awful

bogie, paraded by many good men, that citizenship would unsex woman. On the contrary it has but directed her watchful, maternal instinct to broader fields which she seeks to render wholesome for the rearing of her child. It will take something vastly more terrible than the service of citizenship to unsex woman.

In conjunction with these active interests, the centers study political measures to be voted upon, hearing both sides of the questions from their advocates. During campaign periods, the rural centers, almost without exception become open forums where opposing candidates present their viewpoints upon the same evening, before the same audience, and submit to questioning. Questions are generally allowed for a limited period at all center public meetings, but personalities are immediately called to order by the chairman. Thus an opportunity to vote intelligently is rendered to all.

It may be said then, that the league has done something for the State in promoting good citizenship and in bettering the environment for the child of today and for the generation of tomorrow—for the California Civic League has always known that "its reach should exceed its grasp."

The 1915 officers of the league are:

Miss Julia George, president; Mrs. Dane Coolidge, first vice president; Miss Charlotte Anita Whitney, second vice president; Mrs. William R. Colby, third vice president; Doctor Katherine Howard, treasurer; Mrs. Walter Brown, recording secretary; Miss Florence Locke, corresponding secretary; Mrs. R. C. Young, auditor.

Directors—Mrs. Annette Abbott Adams, Miss Frances McLean, Miss Lucy Stebbins, Miss Lorraine Cerf, Mrs. G. A. Merrill, Mrs. James Ellis Tucker.

Chairmen Standing Committees—Civic extension, Mrs. Richard G. Boone; education, Mrs. Robert O. Moody; finance, Mrs. C. C. Hall; legislation, Miss Charlotte Anita Whitney; organization, Mrs. L. E. Blockman; publicity, Miss Maybelle Feusier.

The Work *and* Purposes of San Francisco Branch of Associated Collegiate Alumnae

By Mrs. Jesse H. Steinhart

AS MISS AMY SUSSMAN, Mrs. Steinhart was one of the most brilliant and generally beloved of a large group of "college women" who are the life and inspiration of the membership of the Collegiate Alumnae of San Francisco. Since her marriage to the young San Francisco attorney she has been no less active in all the affairs, social and serious, of the "Branch," and their home in Fillmore Street is the rendezvous for the artistic and intellectual members.—[EDITOR'S NOTE.]

THE National Association of Collegiate Alumnae was organized in Boston in January, 1882, for practical educational work. Three years later Miss Sarah Dix Hamlin was asked to organize a branch of the association in California.

Graduates of the University of California were not eligible for membership at that time, and without them there were too few eligible women college graduates to form a successful branch. So in October, 1885, an independent organization was formed, which, with the subsequent admission to membership of alumnae of the University of California in March, 1886, became an active branch of the association of collegiate alumnae. Prominent among the early members were Miss Sarah Dix Hamlin, Miss Caroline Cooke Jackson, Miss Millicent Shinn, Miss May Treat, now Mrs. Alexander Morrison, Mrs. May Cheney and Miss Gertrude Mason. Most of the early meetings were held in Miss West's school.

PREJUDICES DISPELLED

The activities of the association were educational in the widest sense of the word.

Through its efforts the prejudice against college graduates as teachers was largely dispelled, and positions found for these in the schools throughout the State.

One of its members, Miss Jackson, was instrumental in the foundation of the Associated Charities, and represented the branch on its board of directors for five years. The importance of physical training for women in universities and colleges under the women directors and examiners was recognized, and at the request of the branch, the university granted the use of the gymnasium to the women students and appointed a woman physician as physical director.

In 1894 the branch effected the organization of the Settlement Association of San Francisco and the establishment of the first social settlement on the Coast. At its request, in 1897 Governor Budd appointed the first woman regent, Mrs. Phoebe Hearst, to the board of regents of the University of California. During all this period committees were dealing with new educational problems, domestic science and art in the public schools, and the socializing of the

school. It was largely through the efforts of the California branch that sewing was introduced into the public schools and that public playgrounds and the wider uses of the school building were established. The appointment of a woman on the board of education of San Francisco was also largely due to the efforts of the branch.

A logical outcome of this interest in the public schools was the study of the school situation in San Francisco, undertaken last year by the school survey section of the branch. A pamphlet was published in 1914 entitled "Some Conditions in the Schools of San Francisco," which undoubtedly was the means of increasing by over a hundred thousand dollars the school appropriation for the year 1914-1915.

The section also maintained a study class on school conditions, with an active membership of over forty, and had free public lectures on all practical educational problems. This section is still actively engaged in the work.

PURE MILK SUPPLY

No less important has been the efforts of the branch to establish and maintain a pure

milk supply for the bay region. The certified milk and baby hygiene committee not only supplies certified milk to the "boarded-out babies" of the Associated Charities of San Francisco, to the Baby Hospital of Oakland and to other institutions, but publishes pamphlets and gives free lectures to mothers on the care and feeding of infants.

Another group is actively interested in the welfare of the women students of both Stanford University and the University of California. A loan fund is available for their use and benefits have been given for their club houses.

The branch maintains, besides, four very active literary sections. It does not neglect the social side of life, but offers for the amusement of its members several times during the year plays and pageants and other entertainments gotten up through the united efforts of its musical and dramatic sections.

Its regular meetings are held on the fourth Saturday of the month, and usually take the form of a luncheon, followed by talks on subjects of the day.

CALIFORNIA'S MAGAZINE is to occupy a place in the literary life of the West that is unique. It purposes to portray by picture and story the true munificence of this great State and to bear aloft the banner of progress. It intends, as well, to render unto those who serve California the full meed of praise. It will tell who are doing the big things and how they are doing them. And in this connection, it can not fail to take into consideration largely the wonderful results of the activities of California's women. California's Magazine realizes that the co-operation of the women citizens of California is necessary to its success, and it earnestly desires that this co-operation shall be forthcoming. The publishers will not, rest assured, be insensible to the reciprocal duty that is theirs. The women of California will invariably find in this magazine a champion of their rights and of their interests.

Women as Farmers *in* California

By
Mrs. Emily
Hoppin

*President of
California
Federation of
Women's Clubs*



*M*RS. HOPPIN is president of the California Federation of Women's Clubs. She resides upon a large ranch at Yolo, where she is known throughout the countryside as one of the most successful farmers of that section.—
[EDITOR'S NOTE.]

AMONG the occupations that are opening for women, that of farming is attracting more and more attention; and while all country life has pleasant phases, the country life of California is particularly alluring, both on account of the glamour of romance that has always hung over it, and on account of the mild climate and fertile soil.

What are the opportunities for women as farmers in our State? They are good for a resourceful woman with some capital; a woman who can face some discouragements, some trouble, and some labor. The prospects that are sent out by advertisers can not always be relied upon, for the reason that many times they give the maximum profit with the minimum expense, with no allowance for partial failure of crops, or unforeseen contingencies.

NO ROYAL ROAD

There are women in the State who have built a fine business from a comparatively small beginning, but there is no royal road to fortune in any business. California, how-

ever, offers many favorable conditions, especially in our great valleys.

No woman should come here to engage in business without capital. There is now little desirable land that is not under private ownership. While water in many places is not absolutely necessary, yet it adds a value to every acre upon which it can be placed. In the Sacramento Valley, with which I am most familiar, excellent fruit and alfalfa can be raised without irrigation; but it is always better to pay a little more, and get land where the fruit can be irrigated in seasons when the rainfall is below normal, and where the alfalfa can be irrigated every season, thus insuring almost double the amount of hay per acre.

The price of land varies with the location and distance from a town. The alluvial land near the water courses in the Sacramento Valley can be bought at from \$250 to \$500 per acre. It is well to buy land that has demonstrated its adaptability to different crops and general farming, for poor land often lies within a short distance of good;

but all this alluvial soil has already proved its value.

SPECIALIZATION

As this is the age of specialists, some women have specialized and have done well. One woman, for instance, on land in the Santa Clara Valley, specialized with violets, and from a small beginning acquired a competence. Her location was particularly adapted to violets, and her market was at her door. Another woman whose home was in the Sacramento Valley devoted her energies to olives, and she, too, acquired a competence; but her home was her own, and did not require a purchase.

While these and other specialists have made money, the door of special opportunity does not open to all women; the safest way is to plan for intensive farming. To use a homely phrase, your eggs are not all in one basket, but a rotation of crops and diversity of interests not only equalize the farm work through the year, but are more likely to insure a reliable income.

Let a woman buy twenty acres in a favorable part of the Sacramento Valley. She ought to allow at least \$300 an acre for her land, a price which should insure her land subject to irrigation, possibly with the water already on it. The alluvial valley land is capable of producing a wide diversity of crops; not only cereals and alfalfa, but all kinds of fruit, including prunes, almonds, olives, pomelos, oranges and lemons.

ALFALFA DEPENDABLE

Alfalfa can be depended on to produce five crops per year, with an average yearly yield of from five to ten tons per acre. The latter, however, is unusual. If one markets the alfalfa in cattle and hogs, a maximum price can be obtained, provided it is borne in mind that a poor cow will eat as much as a good one. It is not advisable to keep a cow that will produce less than an average of a pound of butter a day, and in these days, an average of two pounds is nearer

the mark, which with the by-products of the milk gives a good margin of profit.

Raisin grapes are particularly adapted to the valley soils, and after they are well started can nearly always be depended on for a crop that with average prices will net close to \$100 per acre. Almonds also are as profitable a crop as raisins, and are easily cared for and harvested. Peaches, apricots and plums are more perishable and need prompt harvesting. Prunes require irrigation to obtain the best results, and care should be taken in the selection of varieties. The citrus fruits are also profitable, and so far have been free from damage by frost; these, too, need irrigation and careful cultivation. Fowls ought to find a place on our small farm, and with care can yield a profit besides furnishing the eggs used in the household.

A selection of any of these fruit products may be made, which in conjunction with part of the land devoted to alfalfa, and to a rotation of crops, will yield a good income if one has freedom from expensive sickness, has an average family, and not too great a desire for luxuries; so there is no reason why women should not succeed as farmers in California.

Even with a small income of money, the farm life of California can bring in a generous income of happiness. Food and clothes for the body are not the sum of life; the food for the soul is equally necessary. Each season in California is a delight; the verdure and flowers of spring, the long summer days, which, though hot and dry, bring the perfect mornings and the wonderful, star-lit nights; the hazy autumnal days that are something to remember, and the rainy ones of winter that waken the earth to new life—all these bring "an inward joy in all things heard and seen"—a joy that can not be measured by dollars and cents, but is measured by growth of soul and love of God.



My Work as Assistant U. S. Attorney *for* Northern District *of* California

By Mrs. Annette
Abbott Adams

*Assistant U. S. District Attorney and a
Graduate of U. of C.*

MRS. ADAMS was appointed an assistant United States district attorney in September of 1914, and since that time has brilliantly conducted a number of prosecutions for the federal government.

From teaching in the public schools she graduated into the law, taking her degree of Juris Doctor at the University of California in 1912. She was admitted to the bar of California the same year, and practiced in Plumas County until June of 1913 when she established a law office in San Francisco with Miss Marguerite Ogden as a law partner.—[EDITOR'S NOTE.]

THE reader who expects to find a "story" in this article is doomed to disappointment unless, perhaps, he feels as I do, that the fact that the work which is given to me as assistant United States attorney does not differ from that of the men assistants in the department is significant.

In my opinion there is no particular reason why a woman lawyer's work should differ from that of a man lawyer, whether engaged in the service of the government or in private practice; but the importance which the public press has attached to my appointment as a federal prosecutor is evidence that

in the mind of the public there persists a contrary opinion, and if it were otherwise I would probably not have been asked to write this article.

To be a "lawyer" without the distinction of being a "woman lawyer" is to be a "consummation devoutly to be wished"; and until the public shall have come to realize that success in any line of endeavor is dependent upon the fitness of the individual, and is not a matter of sex, we women, whether in the professions or other fields of labor, shall not have truly arrived.

A LIMITED PROFESSION

The profession of law for centuries has been limited almost exclusively to men, and they have guarded it jealously. Only about one thousand women have been admitted to the bar in the United States, and three states, Virginia, Georgia and Arkansas, still deny to women the right to practice in their courts. Not all the women who have been admitted have engaged in active practice; and a certain prejudice, not entertained exclusively by men, has made success for the woman lawyer difficult of attainment, for clients are necessary to the practice of law. Even here in California where for many reasons, of which equal suffrage is one, the opportunities for women are greater than they are anywhere else in the world, while women have generally been accorded a friendly welcome into the legal profession, there are nevertheless those who vouchsafe us only a gentle tolerance coupled with a mild patronage, which a saving sense of humor only renders innocuous.

And therefore I say that perhaps the fact that my work as assistant United States attorney does not differ from that of the men assistants has a deeper-significance than may at first glimpse appear. At any event I like to think so. But of my duties!

Section I of article III of the federal constitution provides that the judicial power of the United States shall be vested in one Supreme Court and in such inferior tribunals as the Congress may from time to

time ordain and establish; under this power Congress has established among other tribunals the United States district courts, having jurisdiction over certain districts into which the United States is divided. California is divided into two such districts, known as the Northern and Southern districts, each having two district judges. Terms of the district court for the Northern district are held at San Francisco, Sacramento and Eureka, and for the Southern district at Los Angeles, Fresno and San Diego.

By the federal statutes these district courts are given jurisdiction in certain specified matters, among others being civil suits brought by the United States, cases arising under the postal laws, under the patent, copyright and trademark laws, all civil causes of admiralty and maritime jurisdiction, suits against consuls and vice consuls, and all crimes cognizable under the authority of the United States. The United States attorney and his assistants for any district represent the government in all civil suits to which the United States is a party, and prosecute all criminal cases cognizable in the district courts.

Thus far my work has been mainly in criminal matters, such as the prosecution of offenses against the postal laws, forgery of government obligations, counterfeiting, smuggling opium, violations of the revenue and navigation laws, and the white slave traffic act, and crimes committed upon the high seas or upon territory under the exclusive jurisdiction of the United States.

Reports of offenses reach the office of the United States attorney from various sources; through special agents or inspectors in the various departments, such as the post office, the internal revenue, the treasury and the bureau of investigation for white slave matters; through the local police department and from police officers throughout the district. On receipt of a report of a violation the matter is assigned to one of the assistant United States attorneys, who is thereafter in charge of the case, and who presents it

to the United States commissioner or to the grand jury, or to both, as the case may be, finally tries it in the district court, and, in case an appeal is had, carries that on in the circuit court of appeals.

Prosecutions are begun either by a complaint sworn to before a commissioner who acts as a committing magistrate, or by indictment by a federal grand jury. In the former case, on the filing of a complaint a warrant of arrest is issued by the commissioner, and the arrest of the offender is made by the United States marshal or one of his deputies. The defendant is then brought before the commissioner for a preliminary hearing; if the commissioner finds "probable cause"—that is, reason for believing that a crime has been committed by the defendant—he holds him to answer to the grand jury, and may admit him to bail. Occasionally an accused person is released by the commissioner on a showing that he is probably innocent.

Before the grand jury, a body of twenty-three men, twelve of whom must vote for indictment before a bill can be returned, the case of the prosecution only is shown, the government calling witnesses for that purpose. If an indictment is voted it is then returned into open court, and the district judge orders a bench warrant to issue. Under the authority of the bench warrant the United States marshal brings the defendant into court where the indictment is read to him and where he enters his plea of "guilty" or "not guilty." If the latter plea is made he is either released on bail or held in jail awaiting trial.

The federal government has no jail in California, but by contract with Alameda County federal prisoners are kept in the Alameda County jail in Oakland, or, if convicted of felonies they may be sent to McNeil's Island, to the federal penitentiary there. By arrangement with the State of California, federal prisoners have sometimes been sent to the State prison at San Quentin.

ETHICS OF THE CASE

It is frequently argued that women can not be successful prosecutors because they are by nature defenders. While it is perhaps true that social conditions put women on the defensive in the game of life, is it not possible that the supposition that therefore they can not serve as prosecutors is based upon the popular misconception of the obligations of a legal prosecutor, which measures his success by the number of convictions had, without regard to whether a conviction in a particular case would be truly just? And is it not a belief that the ethics of women would prevent them from prosecuting vigorously those whom they believed to be innocent that is at the bottom of this, rather than a conviction that they lack the capacity to prosecute successfully in a proper case? A prosecutor is not necessarily a persecutor, and if the prosecution of an offender against the laws is not a defense of society, the whole system is wrong. But that is beyond the scope of this article; and the opportunity having been granted me to justify my belief in the capacity of women by deeds rather than words, let me return to my duties.

AS A CONVINCING TESTIMONY to those who may ask concerning the educational facilities of California, it may be stated that the school system of this State is rated third in the United States by the Russell Sage Foundation.



Silk Culture in California

By Mrs. D. J. Murphy

President of Ladies' Silk Culture Society of California

MRS. MURPHY is a pioneer San Franciscan, who, after reading an exhaustive treatise on silk culture in Europe, decided to investigate the conditions in California with reference to raising silk worms and the mulberry trees upon which they feed. She induced a number of friends to join her in establishing an experimental farm in Rutherford, Napa County, where they have by actual production for a number of successive years, proved to their own satisfaction that California offers remarkable possibilities as a silk manufacturing State. Mrs. Murphy is the widow of a former district attorney of San Francisco.—[EDITOR'S NOTE.]

THE MEMBERS of the Ladies' Silk Culture Society of California beg to call your special attention to their work, which must appeal to every person who desires to help our boys and girls to a practical knowledge of a branch of industry that for thousands of years has proven a source of wealth to every nation that has fostered it.

Now the United States sends over ninety million dollars a year to foreign countries for raw silk.

Why not raise this raw material ourselves and keep this vast sum of money at home?

Experiments have demonstrated that California is better adapted by its soil and climate to the growth of the mulberry tree, the natural food for the worms, and for the raising of them, than any other country on the globe.

The Ladies' Silk Culture Society of California has practically shown that this industry can be successfully carried on as a special business on any scale desired, in over thirty counties of this State. It would certainly be more remunerative than many other speculative investments, making us independent of this foreign importation. To

those who argue that we can not compete with the cheap labor of Asia and Europe, we answer, we have done so in other branches of productive industry, notably in fruit, wine and varied other productions.

The raising of silk worms from its very nature is a home industry; it calls for no large investment of capital—a few patches of the mulberry tree planted round the home, the orchard and the garden, by the men; the labor of caring for and feeding of the worms can be done by the women and children of the family. The work is easy, particularly to those who are unfitted for severe or rough labor.

When the cocoons are ready they can be sent to the filature station and sold, as the farmer now disposes of his fruit to the canneries. The modern methods in most silk-raising countries are carried out on these lines.

In former efforts that have been made to promote this industry in our State, the great drawback to a permanent success has been and is the lack of knowledge on the part of our rural population of the great value of the industry and in not knowing how to raise the worms, there being no educational institution in the State for this purpose.

The art is not difficult to acquire; it can be easily learned from printed instructions, which, if carefully followed, will result in success.

The society will freely give these instructions, which also will be printed in French and Italian, to those desirous of experimenting.

Till within the last few years the reeling of the silk from the cocoons was also done in the home, but the old-fashioned hand loom is now almost a thing of the past. Reeling the silk from the cocoon has become an organized factory industry, giving employment to thousands of girls and women all the year round.

The Ladies' Silk Culture Society will, in the near future, own one of these latest, up-

to-date machines for reeling, and will buy at the highest market price all the cocoons offered them. The art of reeling will be taught by expert teachers and this branch of the industry will be carried on in the city. It is by such practical efforts as these that the society hopes to establish this valuable industry in the State.

The basis of silk culture is the mulberry tree. The first step, therefore, to future success in developing the industry is to plant the trees everywhere throughout the State that is best adapted to the raising of the worms, not only around the home, but in every vacant corner of the farm, along the highways, as shade trees, on river banks and the foothills that are now uncultivated. It should be the duty of the supervisors in every county to provide funds for this purpose.

In all European silk-raising countries the governments take the greatest care that these trees are provided and cared for, hence the great commercial value of the industry. Every school house in the State should have a few trees in its yard, and practical instructions in raising the worms given to the children. This also is provided by the government in silk-raising countries.

By such methods as these the industry will spread and another source of wealth to California be assured. Every nurseryman throughout the State should at once realize what the value of these trees will become in the future.

Samples of the raw silk, raised by us, have been placed in the information bureau in the Ferry Building, San Francisco, and also at the Chamber of Commerce, Napa County. A spool of our silk was reeled by Carlson & Currier at Petaluma, and pronounced equal to the best raised anywhere.

At the recent Land Show in San Francisco a gold medal and the blue ribbon was awarded for raw silk raised at the Agricultural Institute, Rutherford Farm. An exhibit of California raised silk is made at the Panama-Pacific Exposition.

California's Women

By Mrs. Marie Hicks Davidson

(Editorial)

A FAVORITE jeremiad directed at the modern woman is that she is not the sturdy specimen of the pioneer times, that she is flaccid, lazy, selfish, irresponsible. As a matter of fact, there is no modern woman. Woman has not changed in all the ages. She still is the female of the species, with the same inherent characteristics to be found in the babe of yesterday as were in the Mother of the Gracchi. It were just as consistent to speak of the modern man as a creature entirely different in mould and attributes from Adam or the supermen of the Golden Age. Even in the days of ancient Rome a Latin writer lamented, in a line which since has become a classic, "The times have changed, and we have changed with them."

That is the secret of the entire situation with reference to women. The times have changed, and women have changed with them. True, it is a far cry from the courageous creature who crossed the plains with her husband, to the exquisite chatelaine of a steam-heated apartment. But the fault lies not with the woman. She now has no plains to cross. The other had no steam-heated apartment. Neither did man in those other days pay a price to have his nails polished or his face massaged.

The average man or woman gives only what is demanded, does only what is necessary, follows the line of least resistance, conforms to the manners of the times. It is the average which preserves the race. It is the average man who arises to occasion. It is not necessary or becoming for him to make a show of bravery when there is no need.

So with woman. Even so with the modern woman, that mythological being who is said to be jejune and altogether unworthy of her ancestors.

So with the California woman. The time when she hewed wood and hauled water is past. She did it when necessary, did it uncomplainingly, and found her strength equal to the need. Now, after times of stress and peril, of physical labor and crude living, she has come to another era in her development. Some there are still living who came to California in prairie schooners. They do not disdain now to loll in limousines. Accretion along all lines has been their portion. They have accumulated experience, capacity to enjoy, a widened horizon, a broader sympathy, tolerance, understanding. They and their daughters are doing the work now to be done. They have nothing to do with yesterday, except to profit by the experience of yesterday. For yesterday's work is done.

And what is today's work? What is the *zeitgeist* of the age?

The faddists and the extremists excepted, woman is doing what she has always done, the thing nearest at hand. She is, as always, consecrated to service to humanity. The kindly, the useful, the humane, the necessary, the exigent, these are the things which she is doing, whether they be in the home, the schoolroom, the field, the legislature, the market place, the hospital or the death chamber.

There is no sex in vocation, no gender in work, no physical classification of mind. Work is utterly neuter, and the best work is that which is most skilfully and conscientiously done.

tiously done. Perhaps that fact is more fully realized in the West than elsewhere. It may be because here the traditions do not trammel. Perhaps it is that the eternal verities have greater influence in virgin surroundings. Whatever the reason, it is a recognized fact that woman in the West is given credit according to her achievements and that by her work she is judged. She stands side by side with her co-workers, be they men or women.

There is no woman's building at the Panama-Pacific Exposition, which is now attracting millions to San Francisco. The fact is significant. It is a commentary upon woman's status in California. She is not segregated. If she farms she takes her place with agriculturists, and not with "lady farmers." If she votes she goes to the common booth and there awaits her turn. There is no booth for the "lady voter." If she practices law she takes an office in a public building, and appears in courts of law. She defends, prosecutes or counsels whomsoever comes to her. Does she paint? Then she "has real saints to paint from," according to her vision and her genius.

She does not compete with man. She is trying to live her life as competently as he lives his. By experience and inclination she is more fitted to some things than to others. And in those avenues she seems to excel. It is only long practice which makes for this fact. In the business of replenishing the world, her functioning is dictated by nature. But that is quite apart from her mentality and her capabilities. The fact that hers is the most important part to play in that respect does not argue that her place in the scheme of things is more important than that of man. It is but another proof that she is a complement of him.

Women in California are not attempting to effect reforms for "the sex." There is no one-sided emancipation afoot. They are doing things for the race. Until man has subdued the earth there will remain the necessity for common service, nation to na-

tion, family to family, man to man. Because California women go to the legislature and there present bills which they believe necessary for the comfort and well-being of their children, it is not to be supposed they are attempting to promote feminist propaganda. If they are not benefiting humanity, at least they believe they are doing so. Angels can do no more than have good intent, and do the best their circumstances allow. Which calls to mind that men once engaged in bitter controversy as to whether angels were male or female.

The decline of women's civic clubs in California would seem to indicate that woman herself has realized the futility of setting herself apart. These institutions were at variance with the very principles she expounded. The success of co-education in the two largest seats of learning in the State are a living proof that it is not good for man to be alone.

"Woman's work" is a hollow phrase. Were such a thing ever intended the Creator would have placed the males upon one hemisphere and the females on another, with an impassable gulf between. But He did not do that. "Male and female created He them." From preceding pages the reader will discern that women are doing their part in the development of California, and no more than their part. They have taken up the duties at hand, are trying to solve the same problems as are their brothers, are learning the same lessons, setting the same ideals. If it be true that the soul's highest duty is to seek its sphere and there to be of good cheer, then the California woman is taking her place on Parnassus. For she is abreast with optimism. She sees no danger to the race. She sees work—not woman's work, or man's work—but work, service, as the deliverer from whatever bondage there may be for her or her daughters.

The preceding pages, written by women who work, are an anthology of efficiency.



THE TRAVELERS' AID SOCIETY of California is a permanent, non-sectarian, non-partisan organization, formed at the suggestion of the Woman's Board of the Exposition, to take care of the great volume of travel which began to filter through San Francisco at the opening of the Exposition, and which will continue indefinitely, on account of the facilities offered by the Panama Canal.

Agents of the society meet every train and boat which bring travelers or immigrants to California. They assist homeseekers to find just what they want according to their means and their tastes or capabilities. They tell the traveler of the reputable hotels and lodgings, and assist them in reaching these places from the railroad stations or ferries. They are, in short, a reliable bureau of information and encouragement.

Catholics and Protestants, Jews and Gentiles, men and women, comprise the directorate of the society, and the test for employees of the organization is based upon the strictest moral and efficiency qualifications.

The society has permanent headquarters in the Hearst Building at Third and Market streets, and in the Ferry Building, both in San Francisco.



California Peach Orchard in full bloom.

Courtesy J. K. Armsby Co., packers SUN-KIST Brand of California Fruits.

Why California Leads *the* Entire World *in* Fruits

By E. J. WICKSON



Blossom-laden Prune Orchard in California.

Courtesy of the J. K. Armsby Co.



Among California deciduous fruits, the peach is supreme, growing in nearly all parts of the State and possessing a long ripening season. It is also superior in size and texture for preserving processes over peaches grown in other parts of the country. The above illustration shows in natural colors one of the many varieties of peaches grown in the interior valleys of California and packed as the "Del Monte" Brand by the California Fruit Canners' Association.

Why California Leads *the* Entire World in Fruits

By E. J. Wickson

(Editorial)

CERTAIN facts which are of great interest and importance in connection with fruit growing in California are these:

First. Fruit growing and the preparation of fruit products constitute the leading industry of California. The output, from its beginning on a commercial scale about 1880, reached a product value of \$29,019,236 in 1899 and of \$50,706,869 in 1909—an average increase in value of about \$1,500,000 per year during its first two decades and about \$2,000,000 per year during its third decade. These valuations are from the United States census of 1910 and they distinguish California as the greatest fruit growing State of the Union. They represent the "farm value" of the fruit as it comes from the tree or vine. The product as it appears in the markets of the world in various forms, is conservatively estimated to possess a value of \$100,000,000.

Second. The reasons for this eminence of California in fruit growing are several:

a. The possession of climate which insures the life and thrift of the tree or vine. This can be appreciated when it is understood that, except at elevations greater than those chosen for fruit planting, there is no cold severe enough to freeze the ground and no winter killing of trees. Temperature injuries to fruits are confined to the effects of "frosts," and

"freezing" (which is popularly considered to mean the freezing of water), is seldom encountered. By the use of orchard-heating devices, invented in California, with petroleum fuel, which is very abundant and cheap, because the State is the largest oil producer in the Union, "frost" injuries are demonstrated to be preventable.

b. The length of the growing season, the absence of summer rains, the brilliance of the sunshine and the adequacy of sun heat promote size, beauty and quality of fruit and favor the manufacture of evaporated fruits at a minimum cost.

c. The combination of conditions, which befit the growth of both semi-tropical and temperate zone fruits, gives California command of a variety of fruits which no other state possesses and which California manifests in fullness and perfection. This will appear more clearly as the different fruits are separately discussed later in this paper.

d. The occurrence in California of vast areas of deep, loamy soils, rich in plant food, easy to cultivate, and encouraging root growth to a depth of ten feet quite generally and occasionally twice and even thrice that depth, as shown by actual digging. Though this is true it is also true that shallower soils are successfully employed in growing fruit.

Third. Aside from natural conditions of climate and soil, fruit growing has reached its present eminence in California through the high intelligence, energy and business ability which are found in the agricultural population of the State. These qualities of citizenship have made it possible to develop methods of growing, preserving, and distant marketing of fruits which are new and characteristic of California. The employment of these methods coupled with the acceptable nature of horticultural work and the opportunity to pursue it nearly the whole year, renders it possible for a horticultural worker to accomplish with ease and comfort twice the work which can be compassed in climates which add the embargo of winter to the depression of hot, moist summer weather.

Fourth. But after all, probably, the underlying secret of success in California fruit growing is the conception of the tree or vine as a producing machine which must be developed and maintained in the highest degree of efficiency. It is this conception of the grower's relation to his trees and the discharge of the duties which such relation requires, which has brought to California fruit growing such notable success and wide repute.

Fifth. California fruit growing has reached its present eminence because of the wide application of business principles in production and in trade. Many of the leading fruit growers were formerly prominent and successful in manufacturing and commercial affairs in the East and abroad. They brought to California the wisdom born of experience. They invented new processes and appliances and they applied the most advanced commercial methods. They matched the favoring natural conditions of soil and climate with their own skill and energy in using them to the best advantage. They have demonstrated the advantage of co-operative organizations for handling fruits in the packing house and in the markets so clearly that California methods are commanding attention in all parts of the world. These facts are set forth in detail by other writers in this publication.

VARIOUS FRUITS COMMERCIALY GROWN IN CALIFORNIA

To show the relative importance of various tree fruits chiefly grown for commercial purposes, the following figures are compiled from reports by the county horticultural commissioners which are published in detail by the state commission of horticulture at Sacramento. The estimated weight of the grape product is based upon the 1913 report and is by the state board of viticultural commissioners:

ESTIMATED PRODUCTION OF LEADING CALIFORNIA FRUITS

	<i>Tons.</i>
Almonds	3,752
Apples	100,443
Apricots	93,189
Cherries	10,646
Figs	6,948
Lemons	56,837
Olives	8,574
Oranges	568,521
Peaches	340,351
Pears	53,483
Plums	34,769
Prunes	95,512
Walnuts	9,231
Grapes	900,000
Total	2,282,283

To present with as much definiteness as possible, information about California fruit growing, a few of the leading facts about each of the fruits will be given under its own name and, for convenience, an alphabetical arrangement will be followed in each of the groups into which the fruits naturally divide themselves.

DECIDUOUS ORCHARD FRUITS

Apple—California has about 3,000,000 apple trees in orchard, of which one-fifth are not yet in bearing. The success attained in growing a winter apple very satisfactory to the trade and capable of distant shipment constitutes this fruit one of the most promising and popular at the present time. About 1000 carloads are shipped beyond State lines and a considerable quantity reaches the London market, selling at the highest prices. There are two distinct branches to the apple industry of California; one is the growing of early varieties like the Astracans and Gravenstein for

sale in the northern parts of the Pacific Coast and the interior mountain states before the earliest apples can be ripened in those parts. The localities where these early varieties are chiefly grown for such shipment are in the Sacramento Valley and the foothills surrounding it. The forcing heat of the spring and early summer brings these varieties quickly to notable size, crispness and flavor. This heat, however, continued into the summer and autumn, makes the same districts quite ill-suited for the growth of winter apples which are prematurely ripened and lack quality and keeping power. The second branch of the California apple industry then, the production of winter apples, is undertaken in parts of the State quite different in climate from that of the early apple regions. The requirements of a winter apple are fully met by two main divisions of the State, viz.: The smaller valleys close to the coast; in fact, in some cases the coast flats, where the exposure is directly toward the cooling breezes of the ocean which produce a cool summer—a long, slow-growing season which develops the greatest beauty and highest quality in a winter apple. Similar results are also produced by the climate found at an elevation of from 2500 to 5000 feet on the interior plateaux and in the mountain valleys. The coast district has developed a greater commercial apple industry than the mountains because transportation facilities for shipment are vastly better, but as the State advances the mountain districts will be employed in this production much more largely than at present. The greatest apple district of the State is the Pajaro Valley, including parts of Monterey and Santa Cruz counties, centering at Watsonville, which ships about 4000 carloads of apples annually. The counties next prominent in apple growing are Sonoma, Mendocino, and San Luis Obispo, while many other counties have good apple orchards in less total acreage; in fact, from San Diego on the south to Siskiyou on the north, localities exist which afford the elevation or the coast exposures which favor the production of good winter apples and planting is progressing in all these districts.

Apricot—California apricot trees stand in the open air without protection of any kind and bear large, luscious fruit. That apricot trees can do this constitutes one of the unique features of California fruit growing and proclaims it different from fruit growing in other states, for excepting a few localities in other parts of the Pacific Slope, California has a monopoly of commercial apricot growing. And yet the apricot does not find all parts of California suited to it. The whole northwest quarter of the State, north of San Francisco Bay, and west of the high ridges of the Coast Range, does not grow apricots commercially, nor does this fruit anywhere ascend above an elevation of 1500 feet upon the foothills. It is particularly a fruit of the protected coast valleys south and east of the bay of San Francisco to the southern end of the State; also of the great interior valleys and lower foothills, avoiding, however, the low places in these valleys where spring frosts may injure the crop, though the tree is not harmed. For these reasons it is wise to choose locations for the apricot with some discrimination, but such large areas of land are practically safe that the present great product can be several times multiplied if the world's markets should favor it. The California apricot is of superior size and quality and in canned and dried forms is finding a free field in the countries of Northern Europe for any surplus which is not required in the United States. A point of advantage with the apricot, as with the pear and peach, and to a less extent with the nectarine and plum, is that it has three great lines of demand:

First, as fresh fruit; second, as canned fruit; third, as dried fruit. The tabulation given later in this article shows the relative amount of each fruit taking these forms. More than 3,000,000 apricot trees are growing in California; counties having over 100,000 trees each are as follows: Santa Clara, Solano, Ventura, Riverside, Kings, Tulare, Yolo, San Bernardino, and Alameda, while several other counties closely approach that limit. Some of these counties are 500 miles apart and their success with the apricot shows



Spitzenberg apple orchard, 20 years old, Sonoma County, Cal.

how widely suitable locations are distributed over the State.

Cherry—The cherry is one of the lesser orchard fruits of California because the regions which favor it are fewer and because its commercial field is less, but in size and quality of the fruit and prolific bearing of the tree, the cherry is a great fruit in locations which meet its requirements. The cherry requires a modification of summer heat and of the dryness of summer air and for these reasons it does not thrive on the interior plains, even when irrigation is employed to regulate soil moisture. In the central coast valley and in the smaller valleys tributary to the great Sacramento Valley and on the river lands, where depth of soil prevails and modification of air dryness is secured by abundance of adjacent water, the cherry behaves magnificently. Elevation also secures conditions suitable to the cherry in some cases, notably in Southern California, where the product of trees in mountain valleys at an elevation of 2000 feet or more, is satisfactory and profitable though the trees on mesas below, where citrus fruits thrive, are disappointing. There are nearly

a million cherry trees in California, of which Santa Clara, Alameda, San Joaquin, Solano, Napa, and Placer counties have the largest plantings. Cherry drying has never prevailed in California. The shipment of fresh fruit to the East has overcome its chief difficulties and is now regularly established. Cherries are constantly growing in volume as canned fruit. The acreage at the present time is extending on the basis of the shipping and canning demand.

Peach—The peach is the greatest orchard fruit of California of the deciduous class. A few years ago it was surpassed in acreage by the prune, but the prune was over-planted in situations not befitting it and such unwise extensions of the prune planting have largely disappeared. This restores the peach to the supremacy which it held previous to that unfortunate incident, as it has had no reverses, but has rather gained continually in popularity in spite of occasional low prices. The peach has a very wide range in California. It goes beyond the apricot in the coast valleys north of San Francisco; it goes beside the apricot wherever the latter thrives in the interior, rises

a thousand feet above it on the foothills and goes lower on the plains into the frosted areas with safety because of its later blooming. The peach is a grand fruit almost everywhere; it has a ripening season with different varieties and different locations from May to December, though, of course, the midseason varieties constitute the great commercial crop. The varieties most largely grown are of California origin, being chiefly selected chance seedlings, taken up by enterprising nurserymen on the approval of growers with whom they originated. These varieties have gained fame by embodying qualities acceptable to three main lines of disposition indicated in the table of "Commercial Uses of Various Fruits," near the close of this article. These peach products are derived from nearly all parts of the State, though mainly from the great interior valleys, the San Joaquin and the Sacramento, and the foothills. Fresno County leads in peach production, while Placer, Tehama, Santa Clara, Solano, Stanislaus, and Kings have over 500,000 trees each, while Tulare, San Joaquin, Merced, and Butte counties have over 200,000 trees each. About ten other counties go above

the 100,000 mark. The California peach, though it is now eminent, has even a greater future before it, in spite of the fact that peaches are being widely grown in other parts of the country, because the California peach has such a long ripening season and is so superior in size and texture for preserving processes.

Nectarines—The nectarine is a smooth skinned peach, but it bears no comparison with the peach in product nor popularity. The canned and dried products of nectarines are too small to separately mention, but California produces a magnificent nectarine, and the demand for the fruit may at some time better justify producing effort.

Pear—Because of conditions favoring the growth of pears of the most popular market sorts in greater beauty and volume than they can be produced in older states and countries, the California pear has commanded wide attention in distant parts of the United States and, like the apple has commanded the highest prices for the fresh fruit in the London markets; in fact, the pear stands next and sometimes exceeds the peach in long distance



Orchard scene in Pajaro Valley, Cal.

shipping trade. The pear also is high in canning and in drying, the product has been large in some years though recently there has been little of it, because of high prices paid by shippers and canners. The pear resembles the peach in its wide range over coast valley, interior valley, and foothill situations, but it extends beyond the peach, for it goes to an altitude of 5000 feet on the mountains and it descends to the lowest places in the valleys, for neither frost nor standing water can avail against it. It escapes frost by its slow start in the spring and it endures water and even a degree of alkali in the soil by the hardy character of its root. In ripening also it is not injured by a degree and duration of heat which ruins the quality of a winter apple. Until about a decade ago the pear was free from the "blight" in California and there seemed no limit to the possibilities in pear growing. Since then the disease has wrought havoc and many growers have abandoned the fruit rather than fight for it, but those who wage successful warfare are greatly profited. The leading pear counties are Solano, Santa Clara, Placer, Sacramento, Eldorado, Tehama, Nevada, Sonoma, Contra Costa, Yolo, Yuba, etc., but almost every county in the State grows the fruit in commercial quantities. The varieties grown are comparatively few and the Bartlett is chief, because there are fully two months between the first to mature in early districts and the last in late districts and dur-

ing all this time supplies are ready for shipping and canning of this one exceedingly acceptable variety which permits no intruders while it is in season. The growing of later pears is limited, because the Eastern grown winter pears are usually available in large quantities in the Eastern markets after the California Bartlett has had its run. Still a few shippers are making excellent records with winter pears in distant markets.

Plums and Prunes—By demonstrating the suitability of the climate for the free fruiting of the choicest varieties of the European plum, California growers freed themselves from the burden of building up on the basis of the wild American species which Eastern growers have done with so much credit to themselves. California has no need to seek hardy plums for the tenderest are perfectly satisfactory; nor does California have to circumvent the curculio and the black knot for these have never appeared in the State. The French prunes were introduced at an early day and the product was so successful and profitable and won its way by displacing European prunes in American markets that there arose ere long a rage for prune planting, the product of which, arising to 205,000,000 pounds of dried prunes in 1912, has outgrown the requirements of the United States and is being pushed for sale in Europe, even in France itself. Probably even greater success than could have been anticipated has been attained in disposing of

“CALIFORNIA found that she can produce great riches—citrus and deciduous fruits, dried fruits, and canned fruits of all sorts. But she was staggered by the problem of distribution: how could she send out her riches to the world and not have all her profits eaten up by the grafters and gain-hunters? . . . So, moved by an inspired common sense, they (the yeomanry) drew together into co-operative and defensive bodies; and lo! the tyranny of the middleman dissolved like a rope of sand. . . . On this far coast, without any abstract reasoning on social economics, the people are beginning to take their stand on the rock of collectivism. The stern logic of events has taught them that selfish competition tears down, while friendly co-operation builds up the walls of the social safety.”—*Edwin Markham in "California the Wonderful"—Published by Hearst's International Library Company, Inc.*

this immense volume of prunes and yet as free and profitable an outlet as is necessary has not been secured. When there is a year of maximum product the price is apt to run low and acreage has been somewhat reduced (as stated in the foregoing discussion of the peach), therefore an attitude has reasonably arisen against prune planting except where an exceptionally large fruit can be counted upon. Strenuous efforts are being made to popularize the prune as a desirable food, to push the product into markets in all parts of the world and to realize fair returns for such an excellent fruit as the California prune is conceded to be and progress is steadily being made. California has invented new processes of curing prunes by machinery and other labor saving appliances and has endeavored by human devices to match the economy of production to which nature contributes free sunshine and dry air. Probably nowhere in the world can so rich and delicious a fruit food as the California prune be so cheaply produced and it is warranted to expect that the world will need all that can be produced when organization for distribution and trade is made effective. The largest prune producing counties are Santa Clara (which has nearly two-thirds of all the prune trees in the State), Solano, Napa, Alameda, Sacramento, Tulare, San Benito, Colusa, etc.—both the coast valleys and the great interior valleys participating in the production. The interesting story of the prune is ably told by Mr. Brooks of San Jose on other pages of this publication.

Of plums, aside from varieties which are dried without removal of the pit (and therefore called prunes), the production is relatively about one-eighth that of prunes and is largely restricted to the Japanese and a few other varieties which are particularly adapted to fresh fruit shipments and canning. These fruits are largely grown in the districts where early ripening can be counted upon. The special discussion of shipping plums by Mr. McKevitt, a leading grower and shipper, on other pages of *THE ALMANAC* will be found very interesting. The size and beauty

of the canning plums of California are striking and the product reaches a good volume.

NUTS

Almond—California produces practically the whole of the almond crop of the United States and thus stands as the only source of a home-grown almond supply for American markets. The article by Mr. Pierce on other pages of this publication discusses both production and distribution, in both of which he holds prominent position. It must be emphasized that the almond is a fruit demanding much intelligent judgment from the grower. There is considerable irregularity in the annual crop, as some districts are liable to frost injury. The almond is a very restless tree during the California winter because the temperature in the valleys is always near the point which induces blooming and rather a light frost may injure blossoms and young nuts. For this reason it is very important to select locations for almonds where there is a minimum danger of frost. These are found on the bench lands around small valleys, while the bottom lands in the same valleys might be quite frosty and should be planted with later blooming fruits. Frosts are also less frequent on the plains of the interior valleys where there is a free circulation of air which tends to equalize temperatures, while on the river bottom lands the trees may be unproductive though growing thriftily. The almond does not thrive at elevations in the foothills and seems to be a bench and valley fruit, but even within these limits locations must be chosen with close attention to local topography. The chief product is grown in Yolo, Contra Costa, Solano, San Joaquin, Sacramento and Alameda counties, which are all in the central and northern regions of the State, although many other counties contribute in a smaller way, including Riverside County, and large plantings have been recently made in San Luis Obispo and counties on the coast in the southern half of the State. The wide distribution of the product shows that local conditions rather than wide geographical generalizations, should be studied.

Chestnut—The California chestnut product is small and consists almost entirely of the Italian variety grown in the interior valleys and foothills. The production of the best chestnuts of American and European varieties can be largely and profitably increased, but no particular attention has been paid to the matter, except by a few enterprising growers.

Peanut—On light loams all through the lower lands of California the peanut thrives well and makes a large product of exceptionally large, bright and well-filled nuts. In Southern California the chief product is on the lower lands of the coast region, while in Central and Northern California, peanuts are mostly grown on the alluvial loams of the river bottoms of the Sacramento and San Joaquin valleys, although the crop is sometimes made between fruit trees on the light upland loams. The product has been quite profitable to those who have mastered the details. California has, however, had little inducement to enter into competition in the general markets of the country, and the crop is now hazardous, because of reduction of duties on importations, even for local consumption. At present only a small fraction of the peanuts used in California are grown here.

Pecan—The pecan grows well and bears well in the lower lands of the interior valleys. It does not behave well near the coast where the seasons are not well defined, nor does it thrive in the drier regions of the interior. On deep lands, however, where moisture is ample and where the approach of autumn is marked by rather sharp frosts, the pecan stops its growth and matures its nuts satisfactorily. The product has not yet risen to commercial importance.

Walnuts—The English walnut is the greatest nut grown in California, judged by the volume and value of the product, by the breadth of its adaptability to California conditions and the greatness of its outlook as discussed on other pages of this publication by Mr. Thorpe, who occupies an important relation to the marketing of the product. The present product is almost entirely grown in

three counties in Southern California: Orange, Los Angeles and Ventura, and the adjoining counties of Santa Barbara and San Luis Obispo stand next in acreage of walnuts. During the last few years, however, owing to the profitability of the walnut, there has been a large planting in the central part of the State and the product of the future will be drawn from a wider territory than hitherto. The walnut tree is in fact content with the coast, interior valley and foothill climates, providing it has sufficient depth of soil to sustain it and to furnish the constant, but not excessive, water supply which it needs. Where the rainfall is large and the soil deep enough to retain moisture and yet open enough to prevent standing water, walnuts yield satisfactory results without irrigation. In places with light rainfall or where the soil is too shallow or non-retentive to hold moisture for the long growing season, irrigation is requisite. There is, however, need to select varieties with some regard to localities. In Southern California a local seedling, known as the Santa Barbara soft shell, is chiefly grown. This variety is not so well adapted to conditions in the upper part of the State. The French imported varieties, the Franquette, Mayette, etc., and some California seedlings locally originated are better and are now being largely planted. These varieties are hardy against spring frosts because of their later blooming and they resist the sun heat of the interior. The Southern California variety is injured by these agencies, but as they occur only at a minimum in the Southern California coast regions, the resistance of a variety is not of as much concern. The later blooming varieties are also less injured by the walnut blight—a bacterial disease which sometimes does considerable injury to the nuts.

THE GRAPE AND ITS PRODUCTS

The grape grows in all parts of California from near sea level on the coast to an elevation of 5000 feet or more on the mountains. It is contented, too, with nearly all fertile soils from the deep valley loams, where the great fat, firm-fleshed grapes are grown for raisin and table purposes, to the shallower

The Bartlett Pear

THE BARTLETT is the greatest pear grown in California because in quality it is good; because in commercial suitability it is unrivaled; because it can be picked from the trees, in different parts of the State, from July to September, as stated elsewhere. The Bartlett tree is a good, upright grower, and in California it is such a good self-pollinizer that solid acreages of it may be planted with full assurance of bearing well. Though subject to blight, it is so good otherwise that blight-extirpation is cheerfully assumed by growers. The fruit is handsome; it carries well and ripens during long shipment; it processes well in canning; it assumes beautiful form and color in sun-curing. It is in such strong and universal favor that other varieties, which are grown to extend the season, are judged in terms of resemblance to the Bartlett in their appearance and behavior.

In the Bartlett, California has taken an old, world-beating pear and glorified it beyond all its previous popularity as a commercial fruit. For the Bartlett is a European pear, which was renamed with a Yankee appellation in Massachusetts. It is believed to have originated in England about 1770 and was called "Williams," after the man who first propagated it in England. But the pear has in its list of synonyms many French titles, and one of them, "William's Bon Chretien," seems to fix an old belief that the Englishman borrowed it from France. In fact, the French "Bon Chretien" is traceable even to records of propagation and description of it in 1485. Before, then, the achievement of Christopher Columbus, our Bartlett was perhaps living an honorable life and is now gloriously renewing its youth in California and through our undertakings with it, and the achievements of others who have taken suggestion from them, the Bartlett is not only the greatest pear in California, but the greatest pear in the world—at least from a commercial point of view.

*Illustration by courtesy
J. K. Armsby Co.*





Sun-Drying California Apricots

California Has Apricots for the World

IN THE parts of the world developed and dominated by nations of the Caucasian race there are but narrow areas of land where the apricot tree lifts its head of most beautiful foliage proudly and confidently to the sky and bears great weights of golden fruit without danger of frost injury. The limitation of area over which the apricot is a sure producer is caused by the fact that of the deciduous fruits of the temperate zone the apricot is more subject to frost-injury than any other except the almond. The tree is very eager to start its growth at the touch of even winter sunshine, its blossoms and young fruit are very susceptible to injury from frost and therefore the tree demands exposures which are practically free from spring frosts to assure regular and profitable fruit-bearing. Of course horticultural art has succeeded in contriving artificial conditions afforded by training the tree against walls and by frost shelters, which secure fruit production in northerly situations, but fruit thus grown is an expensive luxury and can never figure largely in commerce. It is true also that hardier varieties of apricots have been developed, but the fruit of such varieties is inferior and the growth of it does not constitute an industry of any importance. Commercial apricot-growing requires climatic characters which favor the safe production of the best varieties in the largest quantities.

Apricot-growing as a commercial industry is pursued at several points in the countries touching the Mediterranean, in Australia, in South Africa and in California. Asia, away from the Mediterranean, has of course apricot production here and there, of great antiquity, but it does not go far in the world's commerce.

Arizona has districts sharing California's suitability to the fruit, and there is small production of some promise in a few locations in the upper Pacific Coast States, but California practically monopolizes the apricot industry not only of the United States but of the Western Hemisphere, although suitable areas for it undoubtedly exist in Mexico and elsewhere southward through South America.

California's greatness in apricot-growing is therefore established not alone upon natural suitability but upon the energy, ability and enterprise of the California people in the development of production and rendering the product serviceable in the world's trade. This clearly appears from the forms which the fruit assumes for final sale. The California apricot crop in a favorable year may be estimated at 125,000 tons as it comes from the trees. Of this, the fruit is used for the following purposes: For local sale as fresh fruit, 2,500 tons; for shipment overland as fresh fruit, 2,500 tons; for canning, 30,000 tons; for drying, 90,000 tons.

The preponderating commercial form which this fruit assumes is the California dried apricot, and as such it is known the world around. It is a distinctive product in the size of the half fruits, which are clearly recognized as largely preserving their natural form and color. This is due to the wise use of sulphur-fumes to prevent darkening by oxidation and to the curing in the sun in a most cleanly way by the use of wooden trays, as shown in the accompanying engraving, and to exposure to the sun only until the surplus water is expelled. Thus the California dried apricot remains elastic, rich-flavored and golden-colored and sells as "evaporated fruit." The dry air and clear sunshine of California are essential to the quality and handsome appearance of this high-class product. The pits of the apricot are also an important commercial product, the kernels being in sharp demand by confectioners as a substitute for almonds and the product is largely exported.

The accompanying photograph shows the manner in which California Apricots are boxed and pressed for shipment to all markets of the world after being sun-dried as portrayed in the picture above.



Illustrations by courtesy of J. K. Armsby Co., packers SUN-KIST brand of California Fruits.

California Raisin Clusters

SIGHT of a grand cluster of California raisins is interesting not alone for its picturesque beauty and suggestion of deliciousness but because of its advancing rarity. Relatively a small part of the California product reaches the market each year in this peerless preservation of the natural form of the grape as it grows upon the vine. While the perfect cluster beautifully disposed and decorated, will always remain the acme of raisin-making art and culture, the raisin cleared of the stems and pedicels and even robbed of its seeds (all of which operations are accomplished by ingenious machinery invented in California) will constitute the food of millions who may perhaps never see the beautiful cluster except as the adjacent picture reveals it to them.



*Illustration by courtesy J. K. Armsby Co.,
Packers SUN-KIST Brand California Fruits*

soils of the high foothills and mountain slopes, where the grapes are less in quantity, but of superior aromatic qualities. This wide adaptation gives an immense area suited for grape culture, but the chief reason for the achievement and the promise of the grape in California is in the fact that the European species, *Vitis vinifera*, thrives and thus the California grower has command of all that the Europeans have accomplished in centuries in the development of special varieties of the species for special purposes. The grapes of the States east of the Rocky Mountains are not grown in California because the European varieties are the only ones from which raisins can be made; they also furnish the world's wine and brandy and they give size, beauty and shipping quality beyond all comparison with American varieties. Wherever wealthy Eastern connoisseurs choose grapes for their glass houses they select European varieties. The Californian grows his "hot house grapes" in the open air. He also grows them without the cost of trellising, because most of the European varieties will bear well in short-pruned bush form and the others accept a high stake or a two-wire support. Details of the grape interest are given on other pages of this publication, Mr. Madison for the raisin branch and Mr. Sheehan for the wine and brandy industry. Briefly, however, it may be noted that table grapes are grown for local use everywhere and for shipping chiefly in Sacramento, San Joaquin, Tulare, Placer, Fresno, Stanislaus, Santa Clara and San Bernardino counties, though other counties participate in this branch. The raisin interest is chiefly concentrated in the center of the San Joaquin Valley in Fresno and Kings counties, though there is a raisin product of some moment in the Sacramento Valley and in Southern California. The wine and brandy interests are widely distributed through the length and breadth of the State.

SEMI-TROPICAL FRUITS

Space will admit only of reference to those fruits of the semi-tropical class which have reached considerable commercial importance. Others which are at present succeeding with

amateurs, and some of which may ere long reach economic account, are too numerous for discussion. Suffice it to say that the date fruits freely in central parts of the State and is now being advanced by systematic effort through plantings on the Colorado Desert by the United States Department of Agriculture and by private planters, as ably set forth by Mr. Mason on other pages of this publication. The banana is fruited for home use in many thermal situations. The pineapple is grown in a small way in frostless places near the coast in Southern California. The cherimoyer is found in the markets of Los Angeles, while the avocado or alligator pear, grown in Southern California, reaches the markets of San Francisco as well. The latter fruit is quite hardy in several parts of the State and has recently been quite widely planted. The guava and the loquat are produced for local use and sale and new varieties of the latter originated in Southern California are becoming widely known. The persimmon and pomegranate grow in nearly all fruit districts, but only a limited amount can be profitably disposed of, either locally or by distant shipment. Many other fruits of the semi-tropical class may be found in the citrus districts.

Fig—The fig is one of the great fruits of California. Old trees attain the dimensions and aspect of oaks and bear so much fruit that it becomes of some importance in swine feeding. The tree is perfectly hardy in all coast and interior situations (except in a few places where the temperature falls 10 or 12 degrees below freezing) and no thought is given to protection. This fact, demonstrated more than a century ago by the padres at the old missions, naturally suggested the fig as a great commercial fruit and for decades it has been successfully grown and trees of considerable age can be found in nearly all counties except those of the mountains. Production has, however, been restricted by the fact that fresh figs do not take kindly to long shipment and by the fact that until recently our dried figs have not compared well with the product of Smyrna. This condition has, however, been completely changed by the expe-



Apricot orchard at 5 years; Sunnyvale, Cal.

rience of the last few years as described by Mr. Roeding in his special article on this subject. The fig industry comes upon a new basis through the successful introduction of the pollination insect which is essential to the success of the Smyrna fig. California Smyrna figs are now being produced in considerable quantities and California is thus equipped to enter into competition with the time-honored Asiatic product for the world's trade in dried figs.

Olive—The olive is another fruit which has been successfully grown in California for more than a century. The importance of the olive as a food in the south of Europe and its standing as an export thence to populous northern countries, coupled doubtless with its favored place in song and story, induced a premature popularity among California fruit planters, and experience with the fruit for a number of years did not justify all the expectations cherished for it. Planting practically ceased for a time and considerable acreage was displaced. Recently, however, through the action of the pure food laws, which have prevented the use of the word "olive" in connection with cheap

substitute oils for salad purposes, and through the process of canning and bottling hermetically, which has made it possible to produce pickled ripe olives of suitable varieties with good keeping qualities, the olive has found itself in our commercial fruit growing and has a bright future, as described by Mrs. Ehmann in her special article on this subject. California is now producing, largely and profitably, good olives and olive products in suitable places through the efforts of masterful men and women who have risen to the requirements of this fruit, in the production of which California has almost a monopoly of favoring climatic conditions. Practically all the counties of the State except those on the high mountains and on the upper northwest coast, have olive trees in bearing—the interior valleys and foothills of the Sierra Nevada leading in the production.

Lemon—Wonderful progress has been made in developing the lemon industry in California and imported lemons have met sharp competition in the markets of the United States by the California product. New varieties have been secured, new methods of culture and

fruit handling have been devised. Though lemon growing is possible in most sections where oranges are produced, the present product is chiefly made in the counties of Ventura, Santa Barbara, Orange, San Bernardino, Riverside and San Diego. The lemon does best in a practically frostless place, being more tender than the orange. For this reason the chief product is in the southern coast counties. In suitable situations in the interior, however, the lemon does well, but has been largely displaced by the orange, which has been on the whole more profitable and is marketable fresh from the trees, while the lemon requires curing and a good part of the crop has to be held from winter maturity to be sold in the following midsummer, when the chief demand for lemons occurs.

Orange—California has accomplished more with the orange than with any other single fruit, and the advance during the last few years has been exceedingly rapid. At present, not only is the United States largely supplied

with California oranges, but the fruit has been successfully sold in England and Germany. For many years nine-tenths of the vast production of oranges came from Southern California, but recent plantings have been largely on the mesas of the San Joaquin and Sacramento valleys and in the central part of the State. The orange thrives in suitable situations through a north and south distance of over 600 miles, and the topography of the State is such that similar winter and summer temperatures occur all through this distance. There is, fortunately, however, some difference in the ripening of the fruit in the different portions of this belt and the northern portion, because of its mountain environment and distance from the ocean, has an earlier spring and summer and is, therefore, able to ripen its oranges for an earlier autumn market. This difference distributes the fruit through a greater number of months and is of great advantage to the product. In fact, by choice of early and late varieties and by using the



A strawberry field in the Pajaro Valley

variation in the season of maturity, California can furnish fresh oranges in large quantities all through the calendar year and can make the United States practically independent of importations. Another advantage peculiar to California is that the orange grown in a dry summer is more dense in texture and has much better keeping and shipping quality than an orange grown in a humid summer. The fruit is also more sprightly and refreshing, and though there is some controversy over the alleged superior sweetness of the Gulf fruit, the popularity of the California fruit and prices which it commands are evidence of its wide popularity. Although the California growers have made the most energetic and systematic effort for the wide distribution of the product for several years the fruit has proved so acceptable that it is evident that the limit of consuming capacity of the United States is still beyond reach and the outlook for the California orange is very promising. The articles by Mr. Wallschlaeger and Mr. Powell on other pages of this publication show the nobility of the product and the enterprise with which it is being handled.

The pomelo or grape fruit is also grown in California, but has not met the extent of demand which was anticipated.

SMALL FRUITS

In California the term "small fruits" signifies only berries and currants, as the cherry is always classed by us with other great orchard fruits, and the grape stands alone as the foundation of a great fruit industry, as has been indicated. Aside from supplies for home use and local markets, there is a large field for small fruit growing for shipment. Berries are largely used by the canners. Small fruits are also shipped from California to markets from one to two thousand miles distant in the interior states and territories to the north and east. The earlier ripening of these fruits in California gives our shippers an opportunity to place the product in this vast region, although there are home grown supplies later in the year. The growing of small fruits is scattered over the State and

the special regions are widely distant from each other. The most prominent for strawberries are the San Gabriel and San Fernando valleys in Los Angeles County, the Pajaro Valley in Santa Cruz and Monterey counties, and the Florin section in Sacramento County. There are, however, many places which have a smaller acreage, but special reputation for fruit out of season; in fact, it is possible to find ripe strawberries every month in the year at some point or other in the State.

DIMENSIONS OF THE CALIFORNIA FRUIT INDUSTRY

There is no arrangement by which enumeration of California fruit-bearing trees and plants can be made, except during the United States Census years, and therefore statistics in these lines are in part estimates and matters of judgment. The best available, and based upon reports by county assessors, are the figures published by the State board of equalization. The following figures are from the report of the State department for 1914, which is made as of March 1 of that year:

NUMBERS OF FRUIT TREES AND ACREAGES OF GRAPES AND BERRIES

<i>Fruit</i>	<i>Bearing</i>	<i>Non-Bearing</i>	<i>Total</i>
Apple	2,044,916	753,313	2,780,229
Apricot	2,578,778	578,940	3,157,718
Cherry	628,699	323,419	952,118
Fig	441,621	61,619	503,240
Olive	638,184	221,923	860,107
Peach	10,199,568	1,297,075	11,496,643
Pear	1,751,326	349,910	2,101,236
Plum	1,017,881	122,308	1,140,189
Prune	8,078,830	1,227,234	9,306,064
Lemon	1,108,639	721,360	1,829,999
Orange	7,919,949	1,676,271	9,596,220
Pomelo	56,224	23,337	79,561
Almond	1,480,768	390,918	1,871,686
Walnut	689,208	424,501	1,113,709
Totals	38,634,591	8,154,128	46,788,719

<i>Grapes (acres)</i>	<i>Non-Bearing</i>		
	<i>Bearing</i>	<i>Bearing</i>	<i>Total</i>
Table	58,799	12,227	71,026
Wine	164,300	30,560	194,860
Raisin	112,168	8,624	120,678
Totals	335,267	51,411	286,678

<i>Small Fruits*</i>	<i>Acre</i>	<i>Value</i>
Strawberries	4,585	\$1,149,475
Blackberries	2,576	282,383
Raspberries and Loganberries....	1,992	304,169
Other berries and currants.....	534	9,697

*The figures on berries are from the United States Census of 1910, none more recent being available.

COMMERCIAL USES OF VARIOUS FRUITS

To show the very important fact that the leading California fruits of the deciduous class have several forms of commercial suitability and to suggest how California growers, merchants and preservers have not only guarded but have also extended the lines of wealth-winning by discriminating intelligence and enterprise in production, preservation and transportation, the following table is compiled, chiefly from the data collected by Mr. Howard C. Rowley, editor of the *California Fruit News*, who is an acknowledged authority in such lines. The figures for fresh and dried fruits are for 1914; for canned fruits, 1913:

Kind of Fruit—	Fresh Shipments (cars)	Canned Fruits (cases)	Dried Fruits (tons)
Apples ¹ .....	.....	31,535	4,000
Apricots	208	848,880	19,500
Cherries	166 ²	162,665	.....
Grapes	8,773	41,665	90,000 ³
Peaches	2,144	2,398,550	32,000
Pears	2,725	529,860	.....
Plums	1,906	65,975	51,000 ⁴
Figs .....	.....	.....	6,200
Lemons	2,954	.....	.....
Oranges	45,594	.....	.....
Various	49	9,405	2,500
Almonds .....	.....	.....	2,250
Walnuts .....	.....	.....	9,000 ⁵
Berries ⁶ .....	.....	105,990	.....
Totals	64,519	4,194,525	216,450

The figures for fresh fruit shipments include only shipments beyond State lines by rail, taking account neither of local marketing nor movement by sea. The figures for canned and dried fruits are intended to represent the total production.

A GENERAL REMARK

On the whole it is true that the immense fruit products of California are being easily

disposed of at fairly remunerative rates, and the business is in good heart and enjoys a good outlook. There is, of course, fluctuation from year to year in the values of different fruits and in the market conditions which they meet at distant points. Such "off years" strike the fruits somewhat irregularly and are discouraging first to one special grower and then to another, because our localities are largely given to specializing, according to favoring culture conditions or otherwise: Still we find that our fruit growing districts have the busiest towns, the handsomest rural improvements, the largest assessment rolls, and are most attractive to home-seekers. While these things are true our fruit industries must be counted in prosperous condition, although the greatest special anticipations are not always realized.

THE LEADING QUESTION ANSWERED

Briefly, in conclusion, the question set in the title of this article may be answered in this way: California leads the world in fruits because the State is naturally endowed with suitability of soil and climate for the production of so many which are acceptable in commerce; because the California people have invested capital and put forth effort to grow and preserve these many fruits to the limits of commercial demand and then by organization and co-operative effort, have passed beyond all previously existing limits by developing new demand wherever on earth such extension was found to be possible. Opportunity for continuance of this effort remains open. The civilized nations are but scantily supplied with fruit-foods. It is California's function to teach them, by example, to produce for themselves to the limit of their natural suitabilities and to supply fruit-foods from her breadth of adaptation and abundance wherever local limits of production may be reached. Thus it is California's duty to lead and her opportunity to supply.

¹Apples not included U. S. D. A. figures California apple crop 1,300,00 barrels.

²Some years 250 cars.

³Raisins.

⁴Prunes.

⁵Some years 12,500 tons.

⁶No data for shipping or drying. Acreage by census of 1910, 9687; value of product, \$1,789,214.

Why *the* Plum Is Great in California

By F. B. McKevitt

*President California Farmers' Protective League; formerly Manager
California Fruit Distributors*

Editor's Note: California grows all the best plums of European origin because the curculio does not live in this State and all the unique plums of Asiatic origin because they are not touched by destructive frosts. For size and variations in forms, colors, flavors—which give beauty and deliciousness beyond all the plums grown in other States—California has no rival in production of plums for long shipment. Mr. McKevitt is a leading plum grower and shipper and gives important details from experience and observation. His article will be read with interest by both expert and layman.

CALIFORNIA seems to be the natural home of the plum. Nearly all varieties that are valuable commercially are grown here and do exceedingly well, attaining a size, beauty and perfection of flavor unexcelled anywhere.

The tree is healthy, entirely at home on the hills or in the valley, and when grown upon Myrobolan, or other wild plum root, is long lived. On the peach root its profitable life on deep and well drained land is twenty-five years or more.

The tree is not subject to disease and insect pests, outside of scale insects which are not usually troublesome. The dreaded curculio, which makes profitable plum growing practically impossible east of the Rocky Mountains, has never found lodgement near here. This insect stings the young fruit, depositing its eggs in the wound, and causes a premature dropping of the fruit, often entirely ruining the crop. The best European varieties are particularly subject to its attack and in consequence their production in the East has

almost ceased, while in California these best plums of the world are triumphant.

Plums are regular and heavy bearers; the fruit is grown on spurs, and usually even in seasons of light rainfall the bud development is ample for a crop. There are few varieties of fruit that can be grown as cheaply, as the pruning cost is less than half that of peaches and apricots, while the tree will flourish in soils that are too heavy or damp to be suitable for any other fruit except the pear and quince. While the cherry, peach, nectarine, and apricot demand a deep, rich, sandy soil, which is classed as our very highest type of orchard land, the plum, grown upon the wild plum root, does well in second or even third-grade land, producing as large a revenue per acre as if grown upon the best and most costly land.

Plums are divided into two distinct groups: A plum that will dry sweet is generally known as a prune; all others as plums.

The former is a most important fruit and is grown more largely than any other of the plum

family, and its varieties constitute the basis of our California prune industry, which is discussed in detail by another writer elsewhere in this publication.

Plums grown for table use are divided into two classes, the European and Japanese. Of the former those best known and most commonly grown here are the Clyman, Tragedy, Purple Duane, Columbia, Yellow Egg, Golden Drop, Bradshaw, Diamond, Grand Duke, Giant, and Hungarian. Of the Japanese varieties there are many and almost, if not quite all, have been originated by Luther Burbank of Santa Rosa, who has spent a life time in hybridizing fruits and flowers, and whose work has resulted in giving to the world some of the very finest productions. Among these plums deserving of especial mention are the Beauty, Climax, Formosa, Burbank, Wickson, Santa Rosa, and Gaviota. With the varieties above mentioned one may plant his orchard so that a constant succession of fruit of both classes may be had from the opening of the season (May, in the Vacaville district), nearly to its close in autumn.

Most of these are consumed in the fresh state only, but some, like the Yellow Egg and Golden Drop, are in demand by the fruit canners. Plums furnish a very considerable part of our Eastern fresh fruit output, amount-

ing to from 1500 to 2000 carloads annually which is a very good thing as production is increasing rapidly also.

For Eastern shipment, in order that the fruit may safely endure a trip covering ten or twelve days, it is necessary to pick it before it is thoroughly ripe, but it has been found that with this fruit the ripening process continues after it is removed from the tree and when exposed for sale at destination has acquired a color, beauty, and flavor attractive to the eye and most acceptable to the palate.

Most plums are heavy bearers, yielding from two tons per acre in the lighter soils of the hills to ten tons in the valley. In order to make the fruit large and attractive it is necessary to pick off the surplus specimens before the hardening of the pit, leaving the largest and finest growing far enough apart so that they shall not touch each other when fully grown. Thinning is a heavy item of expense and not infrequently costs more than the picking of the matured crop. Plum trees usually begin bearing at four years, but do not reach full productivity until eight years of age.

From the foregoing it will be seen that the plum occupies a prominent place in the horticultural industry of California and that its importance is much more likely to increase than to grow less.

CALIFORNIA itself is always a realm of interest and delight to visitors, particularly from the Eastern part of the United States, because of its almost inconceivable range of climate, scenery, and products both natural and cultivated. Northward from San Francisco are fertile valleys, lofty mountains, and vast forests. Southward are areas of specialized products, particularly on irrigated land. Still farther south are the orchards of oranges and other citrus fruits; and in the mild sub-tropical climate of the Mexican border almost everything possible will grow, wherever water can be supplied. California is a wonderland.—*From Editorial in "The Review of Reviews."*

Facts About the Olive Industry

IN ANCIENT GREECE the olive was sacred to Pallas Athene and was a symbol of chastity and peace. For hundreds of years the olive has been one of the leading fruits of the world, borne by a small tree (*Olea Europea*) of the order *Oleaceæ*, and is the most important member of its genus which includes between 30 and 40 species. It is a native of Western Asia and probably of the Mediterranean region and attains a height of about 25 feet.

Throughout the semi-tropical parts of the Old World the olive has been grown upon a commercial basis for many centuries. Individual trees have been known to be more than 1000 years old. The olive was introduced into California during the eighteenth century; parts of New Mexico and Arizona are found to be adapted to its growth, and are gradually coming into notice. Probably the seed was introduced into California from Mexico in 1769 and planted at the San Diego Mission, whence cuttings were taken to other missions throughout California, and this olive, the only one known in the State till about 1880 was called the Mission variety. Since 1880 numerous other varieties have been introduced from the olive growing countries of Europe.

The olive is propagated by layers, suckers, sprouts, cuttings, tips of trees, grafts, buds and seeds; the last three being tedious and slow, are rarely employed. The favorite method is to propagate by means of "tips." These are obtained from small dormant branches, rooted in moist sand and then transplanted in nursery rows. The trees generally begin to bear at eight years and reach full productivity at about thirty. The principal uses of the olive are for oil production; for pickling, either ripe or green, and for drying.

The olive crop of Italy alone yields about 90,000,000 gallons of oil per year. The olives are collected as soon as they become ripe and are crushed in circular stone troughs with a perpendicular millstone; the paste is then pressed in bags and afterward clarified by being pressed in cotton wool. In California the fruit is carefully gathered by hand, bruised as little as possible, and preferably crushed at once, otherwise partly dried in very thin layers, through which air must circulate freely to avoid moulding and fermenting.

The modern crushers do not break the stones. The crushed pulp is placed in linen sheets and pressure applied gradually. A second pressing is made after the pulp has been mixed with cold water; impurities are washed out with clear water, resulting in producing the clear oil demanded for American consumption.

The California production of olive oil is in the neighborhood of 2,000,000 gallons annually. The importations into the United States are nearly 6,000,000; the production and importations of pickled olives are in about the same proportion. There is undoubtedly a large field and a wonderful future for the olive industry in California.



Natural color photograph of California prunes as they grow upon the trees. Below is a prune orchard in full bloom. The prune industry represents to California a yearly income of approximately \$10,000,000 and is continually increasing.



California prunes, photographed in natural size and color, showing how they are faced and packed for shipment to all parts of the world. Prunes grown and cured in California are admitted to be of the first quality. The average annual yield in this State amounts to 175,000,000 pounds.

*Illustrations courtesy J. K. Armsby Co., packers
SUN-KIST Brand California Fruits.*



Conditions *and* Methods of the California Prune Industry

By Joseph T. Brooks

Editor's Note: The prune is now probably the greatest deciduous fruit grown in California as determined by its standing in the markets of the world. Mr. Brooks, resident in a valley which makes about half of all the prunes in California, has long given close attention to this special product and discusses the history of it briefly; the greatness of it as shown by statistics; the parts of the State where prunes are made; the methods of prune making and the varieties largely used; packing and marketing, with something about the distribution to different parts of the world, etc.; also the outlook under present conditions of trade, transportation, etc.

THE prune industry has reached tremendous proportions in California and the product has become a staple crop to be reckoned with annually, as are the wheat and corn crops of the Middle West. The prune is also a staple food—nutritious, keeping well, and, when properly cooked, extremely inviting and palatable. Prunes may be served in so many ways that they can be used every day without becoming tiresome.

The development of this industry bids fair to increase annually and provides for earnest consideration on the part of the packers, brokers and growers to develop markets throughout the world, since the prune is so widely acceptable.

There are many varieties of prunes grown in California, such as the Imperial, Silver, Sugar, Standard (Burbank's latest prune), Pearl, Italian, French Petite d'Agen, Robe

de Sargent and other varieties, but the California French prune, known generally as the Petite d'Agen, is the variety which has predominance.*

This variety is very sweet, its flesh is of fine texture and bright in color, and when not irrigated too freely has less shrinkage in curing than other varieties and is a constant producer.

Prunes may be raised in almost any part of California, but the greatest product attained thus far has been in Central California. Santa Clara Valley, which extends from thirty to eighty miles south from San Francisco, raises

*I would indeed be inappreciative if I did not give full credit for revisions and suggestions to Mr. Leonard Coates, president of the Leonard Coates Nursery Company of Morgan Hill; to Mr. E. N. Richmond, a practical prune grower and packer in charge of the vast business of J. K. Armsby Company; to the *California Fruit News* of San Francisco, and to "California Fruits and How to Grow Them," by Professor E. J. Wickson.



Loaded branches of the Prune Trees, which bend beneath the weight of the heavy crops of fruit

the larger quantity, the annual crop in that valley ranging from sixty to one hundred and thirty million pounds, dried, or from one-half to three-fifths of the total production of the State, and of a quality held to be superior to other localities.

In entering the prune industry it seems most satisfactory to engage in it in those localities where it is known to be a success, and where years of experience have proved profitable results. Therefore it would not be advisable to undertake planting in unknown sections on a large scale until the experimental period has surely passed. It would be unwise for any great number of people to undertake the planting of large prune orchards until they have thoroughly investigated as to whether the market conditions will admit of the increased product, and not glut the market, since yield regulates prices. If there should be a boom

in the planting of California French prunes there might be a tendency to low prices the same as has proved true in the raising of other commodities, but for the next few years it can be assumed that the industry will bear a reasonable amount of planting in favored localities, where the soil and climatic conditions are favorable.

California has such a range of climatic conditions and altitude that section superiority in certain varieties of fruits is true. Therefore one should look well into the natural conditions of soil and climate and their adaptability before undertaking to set out an orchard. California can raise everything within its borders, but the various products thrive better in some localities than others, and it is wise to select the locality where it is known to prove most profitable and attain best results. There is ample room for millions of people in Cali-

fornia in most every line, but let us be careful in our selection that we may not start toward failures in different localities where successes could just as well be attained by planting the proper fruits in soils and temperature adapted to them.

PRUNE PRODUCTION AND TRADE

The California prune yield for a series of years is estimated as follows:

<i>Year</i>	<i>Pounds</i>	<i>Year</i>	<i>Pounds</i>
1895.....	64,750,000	1905.....	62,500,000
1896.....	55,200,000	1906.....	185,000,000
1897.....	97,780,000	1907.....	106,000,000
1898.....	90,420,000	1908.....	57,000,000
1899.....	114,227,000	1909.....	150,000,000
1900.....	174,000,000	1910.....	80,000,000
1901.....	81,600,000	1911.....	190,000,000
1902.....	197,000,000	1912.....	205,000,000
1903.....	165,000,000	1913.....	90,000,000
1904.....	135,000,000	1914.....	95,000,000

The export and import of prunes from the United States is estimated as follows:

<i>Fiscal Year</i>	<i>Pounds</i>	
	<i>Exports</i>	<i>Imports</i>
1900-01.....	10,021,564	745,974
1901-02.....	23,358,849	522,478
1902-03.....	66,385,215	633,819
1903-04.....	73,146,214	494,105
1904-05.....	54,993,849	761,604
1905-06.....	24,869,744	497,494
1906-07.....	44,400,104	323,377
1907-08.....	28,148,450	335,089
1908-09.....	22,602,288	296,123
1909-10.....	89,014,880	.....
1910-11.....	51,030,711	.....
1911-12.....	74,328,074	.....
1912-13.....	117,950,875	.....

As stated above, the Santa Clara Valley produces about three-fifths of the prune crop of California, the balance coming from the Santa Rosa, Napa, Sonoma, San Joaquin and Sacramento valleys. In 1914, up to December 1, 50,000,000 pounds of dried prunes had been shipped from Santa Clara Valley, and the total crop for the season amounted to about 60,000,000 pounds, dried. Possibly 40,000,000 pounds have been raised and shipped in the same proportion from the other sections.

The prices have varied from year to year—some seasons when a large crop is raised, and the European crop is quite heavy, the prices are very low, sometimes reaching a 1½ to 2 cent basis,* and again when a small crop is

raised in Europe a high price is secured in California ranging as high as a 6 cent basis. It has been held by practical orchardists that on a 3 cent basis prunes prove fairly profitable, even with a fair crop. The prune orchard properly cared for is very satisfactory to the producer.

The successful orchardist of today, no matter what variety of fruit he is producing, is the man who uses common business judgment in addition to a general knowledge of soil, tree growth and care. This statement applies to all horticultural interests. Fruit growing, to a degree, is a business, and must have the same consideration as any other business.

HISTORY OF THE PRUNE INDUSTRY

The variety of plum chiefly used in our prune product was first introduced into California from France, the country to which today we are shipping a goodly portion of our production, even though France and many other sections of Europe are still producing prunes. In 1849 Louis Pellier, a French sailor, arrived in San Francisco and went to work in the mines of Trinity County. He did not succeed there, and finally moved to San Jose in the early fifties. There he started a nursery on the property which today is owned and occupied by his nephew. He soon after induced his brother, Pierre, whom he left in France, to join him in California. The two brothers worked the nursery together until the spring of 1856, when Pierre returned to France on a visit. Upon his return to California he brought with him a large number of prune and other fruit cuttings. The prune cuttings were procured in the Ville Neuve d'Agen, from whence the common California prune derives its name, Petite Prune d'Agen—a name only used on the Pacific Coast and unknown in France. With these cuttings the first prune nursery on the Pacific Coast was started.

For many years little thought was given to the commercial production of the prune, but attention was turned to the raising of prunes on a commercial basis about 1880, and from that time on it has been ever on the increase until today the State of California produces,

*Roughly speaking, the basic price is established upon medium-sized prunes; small sized being worth less, and large sized more than the basic price.



A fully developed Prune Tree is a mass of luxuriant foliage

with normal crops everywhere, between 50 and 60 per cent of the entire world's output.

SUGGESTIONS FOR PRUNE PLANTING

To one contemplating the planting of a prune orchard, the first consideration must be given to locality, as has already been emphasized. Inasmuch as the State has been thoroughly exploited on prune producing, the matter of judgment and fact must prevail in your selection of the district of the State in which you are going to plant.

The second consideration is soil. There are thousands of acres planted to prunes in this State today that are not adapted to this variety of fruit, and should have been planted to some other variety of fruit or to vines. The prune tree requires a deep, rich sandy or loamy soil, and from that to a heavy soil, well drained. Upon such soils water is generally obtainable for irrigation purposes. Light or shallow soils do not grow successful prune

orchards. Such a soil as first mentioned will grow large, thrifty trees capable of producing annually from five to ten tons of green prunes to the acre of large-sized fruit, while soil not adapted to prune growing will grow only a small tree capable of producing from two to five tons of prunes to the acre of small fruit. Competition is bound to enter the producing field as well as other fields of the business world, and it is the man who can produce at the lowest cost who will be the most successful in this business. The lowest cost means the greatest tonnage of good fruit to the acre and not the greatest economy in the working of the property; hence the necessity of giving the question of a soil a very thorough consideration and investigation.

The third consideration is the root upon which your tree is budded. In my estimation the myrobalan is by far the most successful root to plant for prunes, for the following

PRUNES

reasons: First, it is the hardiest, and is long lived; second, its roots naturally seek moisture, giving you a deep-rooted tree; third, it will stand more moisture and is not nearly so subject to soursap as the peach or almond root; fourth, the fruit produced from the tree on myrobalan root is firmer and will show a less shrinkage in drying than either of the other roots, thereby making a heavier fruit or grade than the fruit produced on trees budded to other roots.

If your soil is of a light character, then either peach or almond are better adapted, but for genuine prune soil, the myrobalan is the root to select. Of the other two roots generally used for prune, the almond is preferable to the peach. Trees budded to the almond root are good producers and much longer lived than trees budded to the peach root.

The question of planting on the square or

triangular system is largely a matter of choice. On the triangular system a few more trees can be planted to the acre. Do not plant your trees too close together. Plant anywhere from twenty-two to twenty-seven or twenty-eight feet apart. The farther apart you plant, the better opportunity are you going to give the trees to develop into large, thrifty trees—they have more air, sun, and room to develop.

Prior to planting, plow deep. Plowing in the orchard business does not mean skimming over the surface of the ground. It means getting down from eight to eleven inches. This can be done with a disc plow and good stock. Use a sub-soil plow and put it down deep along the rows in which you are going to plant your trees, so as to break the under-crust and give the young root of the tree an opportunity of easy growth.

During the past few years, dynamite has



Prunes are permitted to ripen and fall from the trees and then are gathered by hand, placed in boxes, and carried to the drying trays



Facing prunes: Two layers are carefully faced against the top of the box by hand; the box is then filled and pressed, when the bottom is nailed on. Upon opening the box from the top the fruit presents an inviting appearance

been used in starting young orchards with excellent results, by blowing up the hole in which you are going to place a young tree. If intelligently done, it loosens all of the soil and gives the root every advantage of deep growth.

Planting for the most satisfactory results should be done either during the latter part of December or through January or February.

The selection of nursery stock is a very important factor toward success. Select one year old trees, good, clean roots and plenty of them, with a straight top from four to six feet high. As soon as you get your stock from the nursery, heel in the ground in good shape until such time as you are ready to plant, for it must be remembered that the small rootlets are very sensitive to cold or lack of moisture.

Before planting, examine the roots closely,

cutting off the bruised or broken ends of the roots that have been damaged while being handled at the nursery. Examine close for black-knot or for indications of the peach borer.

Have your ground carefully laid off so that each tree may be placed in its proper position. When you are ready for planting use the planting board (which is made by taking a one-inch by four-inch piece of wood four feet long, cutting a notch in each end and one in the center), placing it so that the stake which indicates where the tree is to be set will be in the notch in the center of the board and then place a stake at each notch at the ends. Remove the board and center stake and you are ready to dig the hole. Replace the board, hold the tree in the center notch and it will stand in the right place.

When planting, dig a hole deep enough so that when the end of the long root going downward rests on the bottom of the hole, the tree will rest two or three inches deeper than it did in the nursery. This means that the point at which the tree is budded is just about on the surface. Very great care should be taken so that the soil is well worked between the roots, using as fine a dirt as possible, and that every root goes out naturally from the tree. If this is not done and the soil is thrown into the hole carelessly, the roots will all be crowded together to the detriment of the future growth of the tree. Head the tree back to within from one and one-half to two feet from the ground. As good a system in securing the measurement for the heading of a young tree is to cut at a point which measures a trifle above your knee cap.

PRUNING, CULTIVATION AND CARE

The most careful consideration should be given to the question of pruning, and here again judgment must be used. Remember you are going to produce fruit for a profit and not wood. At the end of the first year you can commence to mould your tree into shape. About four main limbs from the trunk should be allowed to grow and develop. These limbs should be trained through pruning so that the center of your tree is left open for sunshine, air and the development of fruit producing twigs. Judgment must be used as to the number of branches and laterals which are allowed to grow from the main limb. By proper pruning it is possible to bring a young prune orchard into producing from 1000 to 2000 pounds of fruit per acre at the end of the fifth year; at the end of the sixth year from 2000 to 5000 pounds of fruit to the acre. From that time on there is a gradual and steady increase in production as the tree ages. The inside twig wood will be the first to produce. Many growers make the mistake of pruning their orchards only once in every three or four years. A prune orchard should be pruned not less than every other year, and the grower who trims his orchard each year secures the most satisfactory results. Strive to keep new wood growing and renewing the tree.

Through the spring and early summer months cultivate the ground frequently. Plow first and follow with a harrow, spring-tooth harrow (which is an excellent implement for leveling the ground), disc harrow or cultivator. Finish your cultivating by leaving the ground well pulverized and smooth for the pickers. In the Santa Clara Valley deep fall plowing has been resorted to by many with great success. It has been found that deep fall plowing—from nine to eleven inches—following irrigation is the best remedy against thrip—a pest preying upon the tender young fruit buds in the spring months. Following the fall plowing the spring plowing can be dispensed with if one desires to do so. The spring work can then be carried on with a disc harrow, cultivator and other implements to good advantage.

It has been found in all fruit growing that "Water is King." Fall irrigation immediately following the harvesting of the prune crop acts as an insurance for a crop for the following year, it being a tonic to the tree. Through water, the tree is given additional nourishment after having gone through the dry summer months producing fruit and growing wood; and the young fruit spur is strengthened and becomes strong and vigorous before the tree goes into the dormant stage. Water should be used during the spring months, thereby insuring the tree with ample moisture and nourishment to carry it through the summer months and through the producing period.

Fertilization should be given serious consideration. The question of fertilization is another story, but you must appreciate the fact that the trees can not continually take from the soil and continually produce unless you, on your part, are willing to renew the soil by fertilization.

The keeping of the bark of the tree in a clean and healthy condition must have your attention. This can be done through the system of spraying. The most popular sprays for this purpose being crude oil emulsion, distillate emulsion, known as Buggo, and the lime-sulphur spray. The best time to spray for this purpose is through the months of December,



A panoramic view of spreading prune

PRUNES may be rated as one of California's most prolific and profitable productions. There is scarcely a county in the State where prunes will not grow, though certain sections of Central California seem to be particularly suited to their propagation. The average annual yield amounts to 175,000,000 pounds. The prune industry represents to the State a yearly income of between \$8,000,000 and \$10,000,000 and is increasing each year. This, however, does not mean that there are not opportunities still of entering the field of prune production and interested readers of this publication are invited to write our service department for detailed information relative to the industry—where suitable prune land may be obtained, or growing orchards secured; methods of harvesting and marketing the crops, etc. Prunes are among the surest of crops if proper care is taken in selection of soil and the class of trees, together with reasonable attention to the trees after they



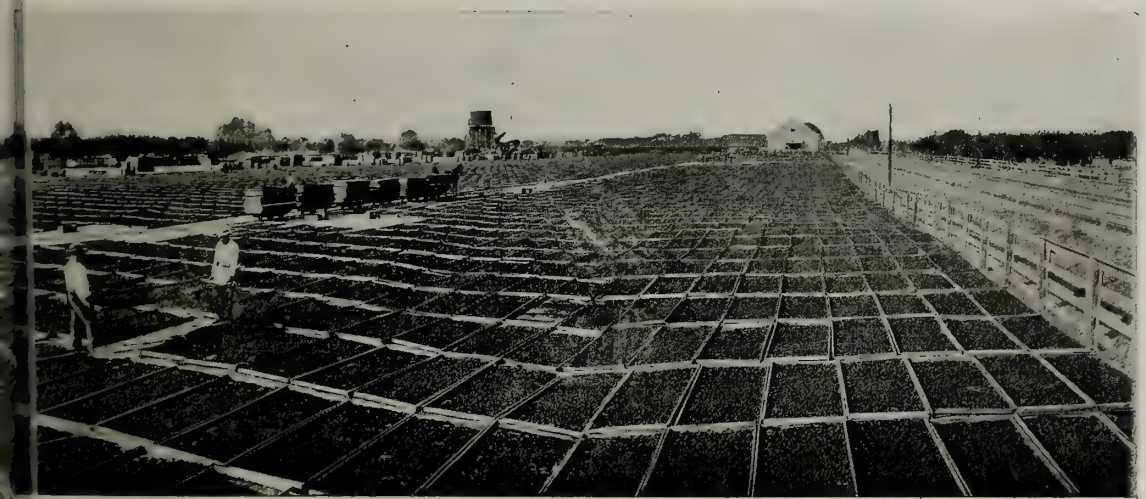
Twenty-five thousand trays containing 1,000,000 pounds



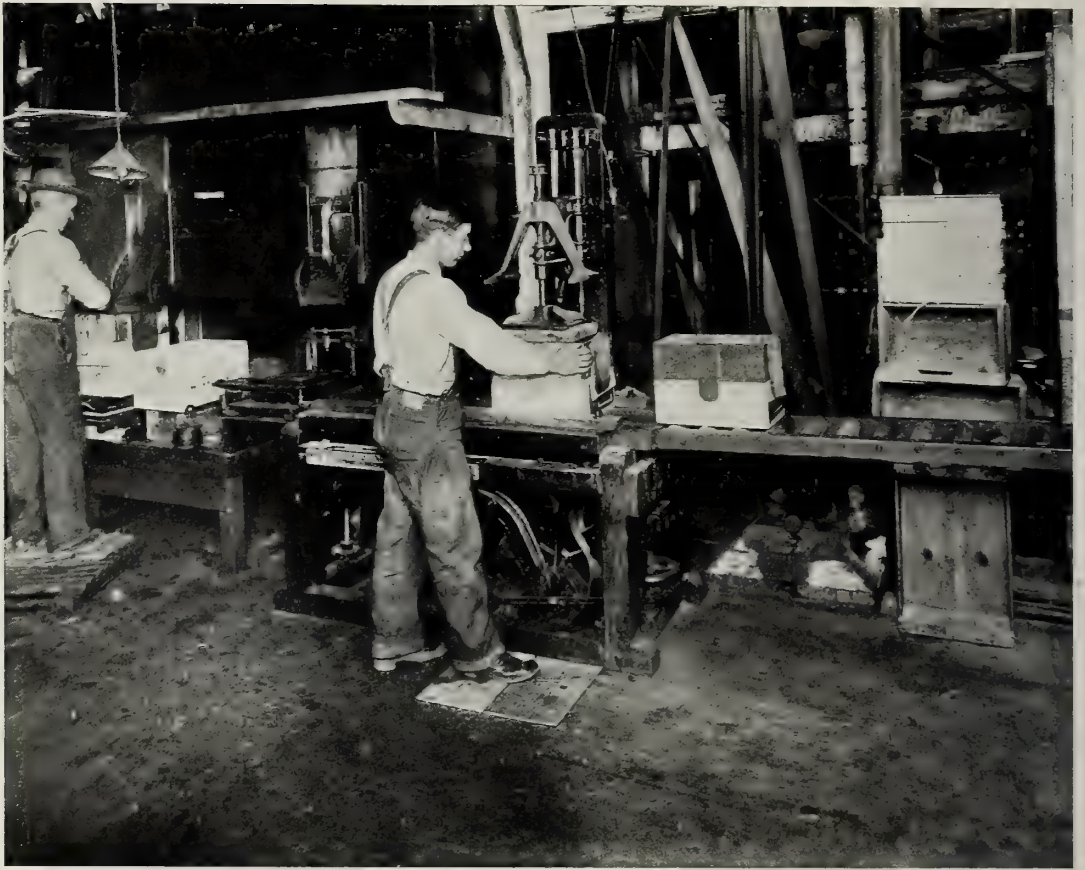
Orchards in Santa Clara Valley, California

are planted and to the curing of the fruit. The California French prune is the predominant variety though numerous other kinds are grown in the State. Prune trees bear heavily and must be so trimmed as to enable the branches to support the heavy loads of fruit when fully developed. A California prune orchard presents a beautiful picture while an idea of the extent of the curing or drying process may be better gained from a glance at the accompanying photograph than from any amount of description.

The prune industry is developing continually and greater interest on the part of fruit men and investors is being manifested as its importance is recognized. The prune is a staple food product of great nutritive value, besides being unusually palatable and susceptible to many methods of treatment by the culinary expert. It is an all the year 'round food, as agreeable in winter as in summer, and always available



Prunes which are being dried in the open air on the ground



Pressing the prunes into the boxes

January, or February. The spray outfit, oftentimes in some sections of the State is again called into use in the fighting of the thrips. It has been successfully proven that this insect can be kept under control by the use of any one of the two or three different well known spray solutions.

HANDLING THE CROP

The prune tree will blossom the latter part of March. Fruit sets immediately following the falling of the petals. A person can generally gain a fair idea as to the kind of a crop he is going to have by the latter part of April. Fruit ripens during the latter part of August and it is of a rich purple hue when ripe.

Prunes should never be picked from the tree. They should be allowed to thoroughly ripen and fall to the ground of their own accord. An orchard should be covered by pickers picking the fruit from every seven to ten

days—every seven days preferably, so as to prevent sunburn. The usual form of contract with pickers call for four pickings, no shaking of the trees until the third picking, and then at growers' discretion.

The green fruit is hauled to the dipper shed in picking boxes and there passed through a light solution of lye. A kettle or tank, holding two hundred gallons of water and containing a basket container is used for this purpose. In many instances the fruit is rinsed by passing from this dip into a vat of clear water and then dumped upon a combination pricking board and grader, which grades the fruit into three grades, so that the drying in the field can be uniform, the grader being operated by power. The fruit is then placed on eight-foot trays and taken to the drying yard and dried in the sun. The purpose of passing the fruit through the lye solution and over the pricking

board is that the skin of the fruit may be slightly cut, thereby facilitating evaporation, preventing fermentation and producing a fruit with a clear, bright meat. Many of the small growers do not use the combination pricker and grader; they dump the fruit directly from the dipper basket to the trays, allowing all sizes to be dried together. This is not as satisfactory to the grower as the first mentioned method. The most satisfactory and economical method of handling from the dipper shed to the dry yard is to use a one-horse truck especially constructed for this purpose.

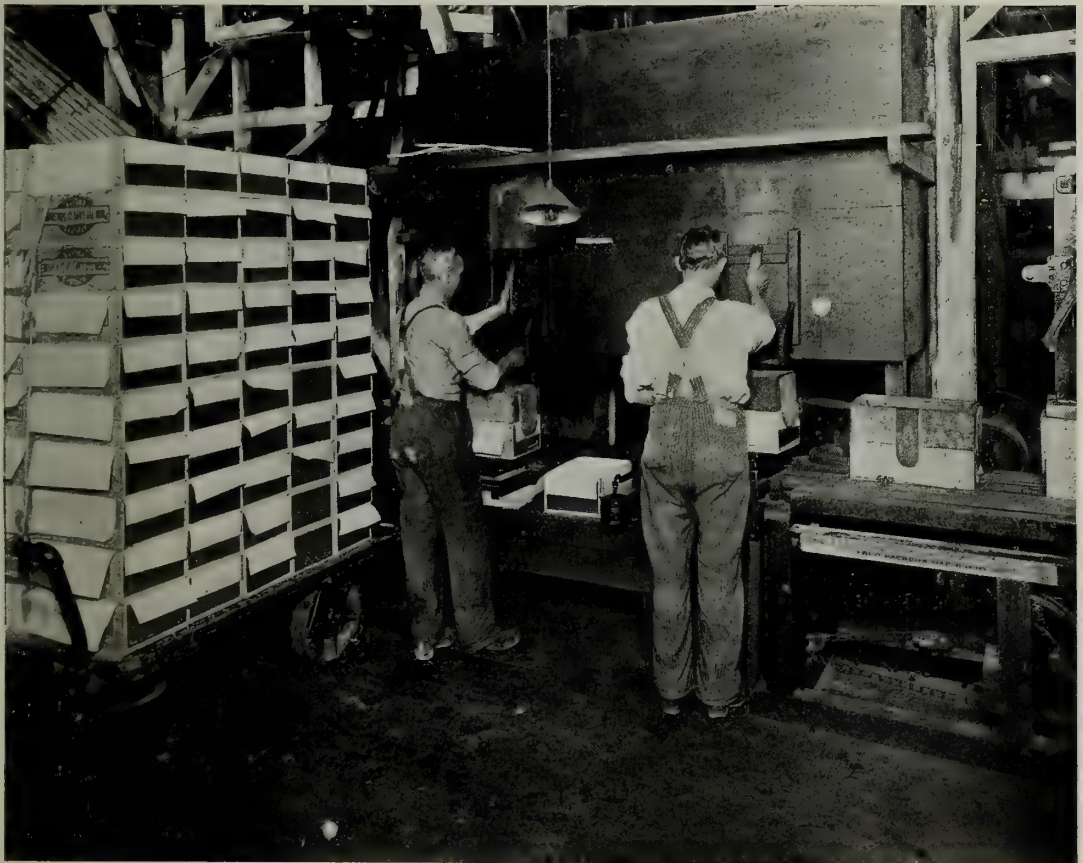
The question of drying is again a matter of judgment. Fruit should be allowed to lie in the sun on the trays until about three-quarters dried and then the trays are stacked in piles one above the other, leaving air vents on either end. About twenty trays can be stacked

in one pile and the finishing process takes place in the stack.

Under normal weather conditions it takes from ten days to two weeks to cure prunes. It has been found most satisfactory while the fruit is on the trays in the dry yard, to give the fruit, at least one turning by hand, shaking the trays or with brooms, so that the fruit secures an equal drying on all sides. It also materially lessens the time of drying and makes a finer grade of fruit. Do not take your fruit from the trays until it is thoroughly cured. This word of caution means the salvation of your business.

PACKING PRUNES

A packer can not turn out, to the trade, a first-class article unless that article is delivered to him by the producer. During the past years most of the complaint against the keep-



Filling the boxes after being faced

ing qualities of the prune has been due to the desire on the part of the grower to retain too much of the original weight of the prune, with the result that he has delivered prunes to the packing houses which were not properly cured. In many instances these prunes have not been detected at the packing house door and have found their way to the trade, with the result that fermentation has set in and the buyer of the California prune loses confidence and refuses to handle a commodity against which he has incurred heavy losses.

Good prunes, well cured, will build up and encourage an ever-increasing demand. Prunes poorly cured will tear down and discourage this demand, so that before taking your prunes from the trays be positive in your own mind that they are properly cured. After properly curing the fruit is taken from the dry yard to the dried fruit house of the orchard and there dumped into bins. From there it is sacked and delivered to the packing house.

Every fruit producer should know by actual and careful testing what each load of fruit tests to the pound when he delivers to a packing house, no matter to whom he is delivering. This is not only justice to himself, but it is justice to the man with whom he is dealing. If he knows positively what his fruit tests he will ordinarily have no complaint to make at the test he secures from his packer, but if he does not make such a test, he is apt to be dissatisfied.

At the packing house the fruit is carefully graded into the different grades, varying from thirty to forty prunes to the pound up to prunes running smaller than 120 prunes to the pound. The grades as to weight and size are obtained by passing the fruit over a large grader which consists of a series of screens of different sizes, commencing with the smaller size and increasing to just a trifle larger size every three or four feet. There are from eight to nine different screens, the larger fruit passing over the end of the grader. As the fruit comes from the grader it is carefully tested and taken to the proper bin. From there it is taken as required for packing purposes to the processor or cleanser. The fruit in the field

has been subjected to considerable dust and dirt, as well as insect life. The processor or cleanser conveys the fruit through a long vat of boiling hot water, thoroughly washing and cleansing the fruit. From the processor the fruit is dumped on a long shaker which further assists in the cleansing process, so that by the time the fruit is put into the boxes, it is in a most sanitary condition.

Prunes are packed in packages varying from one pound to fifty-five pounds. A large amount of help is given employment in the handling of the fruit. The packing allowance made by the trade for fruit packed in various sized boxes all goes back to the various industries of this State, such as the box factories, paper companies and to labor. Packing has been a source of a tremendous income to the State of California. A number of years ago a large portion of our dried prunes were shipped in bags to the larger wholesalers of the Eastern states. They did their own packing, under the most crude methods, with the result that many spoiled and unattractive prunes were put upon the market, as well as prunes from various districts being mixed with our Santa Clara prunes or packed and branded as Santa Clara Valley prunes. In California today every packer is equipped with the most modern machinery and the investment in a packing house amounts to considerable. Men are in charge of the various departments of the packing houses who have had long experience in the handling of fruit, with the result that our fruit is being turned out to the trade well packed, in good keeping condition and in attractive packages.

The improvement in the producing, curing, and packing of the California prune, as well as its original quality, has made it the most popular prune in the world today. Even though there are large prune-producing sections in Europe, nevertheless our California prune has such a recognition throughout the European countries that today we are exporting about 50 per cent of our entire output annually, and we are importing from Europe less each year.

The prune industry in the State today rep-

resents an annual average production of 175,000,000 pounds of dried fruit, or an annual income to the State of from seven and one-half to ten million dollars. It deserves the most careful attention; first, on the part of the producer, in seeing that he is producing an article of high grade; second, on the part of the packer, in giving the closest attention to the packing of the fruit delivered to him, that the fruit might be delivered to the trade

in the most sanitary and attractive manner possible; third, on the part of our State Horticultural Commissioner's office, in seeing that the industry is given his most careful attention.

In conclusion, it may be said that prune producing is one of the most profitable of fruit productions when proper care has been given to the selection of the soil, to the class of trees planted, to the care of these trees and to the curing of the fruit.

The Vitality of the West

By Mary Austin

In the "Century" for April, 1915

UNDOUBTEDLY, the development of the creative spirit in the West is affected by the sense of sustained vitality in nature. A blossoming almond orchard is not only a beautiful thing; it is also an inescapable thing: it scents the air for almost as many miles as its delicate, roseate cloud takes the eye along the foothill slopes. Swarms of fallen petals drift in the roadways like snow. And the long rows of the low-trimmed muscats, reaching out from vine to vine with advancing summer as though to take hands against the weight of the harvest—how they assault us with the visible process of earth and sun and air made into wine and food for man! At every turn the consciousness of something doing, something vitally connected with the large process of nature and our own means of subsistence, raises the plane of expectation. There *is* something doing every minute in a country of such varied topography, as the procession of harvest follows the season. Orange picking begins in December and overlaps the pruning of the deciduous orchards. The smoke of the last burning has scarcely passed from the shorn trees of the highest, most northerly valleys when the flowering of almonds and apricots opens the honey harvest. The berry pickers move in solid phalanxes from the cherry lands of Napa and Santa Clara to the river bottoms, and from that on to the August hop picking and the raisin drying all labor is in flux. It passes up and down the great Twin Valleys in "free companies," working, eating, and as often as not sleeping in the open. During the brief season of the rains it is housed in packing sheds and preserve factories, but for the greater part of the year the human labor is as much a part of the great outdoor pageant as the woodpecker or the ant.



Three-year-old Washington Navel orange tree

Citrus Fruit Industries of California

By F. O. Wallschlaeger

Secretary Citrus Protective League of California

Editor's Note: The organization which Mr. Wallschlaeger represents deals with all the varied interests of citrus fruit production in California and his treatise is such a comprehensive and related view of this, the greatest of all California's fruit groups, as is most needed for popular information. Mr. Wallschlaeger is well equipped for this writing by his official connection with the California Citrus Protective League and the California Fruit Growers' Exchange, our great citrus fruit marketing organization of producers, concerning which a carefully analytical article by the general manager, Mr. G. Harold Powell, will be found elsewhere in this publication.

THE citrus fruit industry in California now represents an investment of about two hundred million dollars. The total shipments of oranges during the season 1913-14 reached the enormous total of 45,306 cars. Prior to the cold weather in January, 1912, the shipments of lemons in the season 1910-11, reached a total of 6891 cars. The total value of the crop in one season has been estimated at thirty-three million dollars f. o. b. cars in California. The delivered value of the fruit in the eastern markets is about fifty million dollars. The price paid by the consumer will total from seventy-five to eighty million dollars. The fruit is produced by 12,000 growers and 150,000 people depend upon the industry for a livelihood.

California is called the "Golden State," and the citrus trees have perpetuated that name through the golden color of their luscious fruit and through the stream of gold which has rewarded the efforts of the men who have devoted their best talents to supplying the

people of this country with oranges, lemons and grape fruit. The citrus groves represent a veritable empire; indeed, an empire reclaimed from the desert through painstaking effort. The men and women who have founded this industry and who are continuing this marvelous example of the triumph of man over the desert have undertaken to overcome obstacles which have been the downfall of irrigated agriculture in many of the old world countries.

WHY DID THE CALIFORNIA CITRUS INDUSTRY ARISE?

Let us first consider what has brought this industry from its modest beginning of a few seeds, brought up from Lower California by the early Mission fathers, to its present area of 200,000 acres with probably 15,000,000 trees.

The foundation stone on which this tremendous industry rests is contained in the favorable climatic conditions, which make it possible to have these evergreen trees growing and



Where Oranges attain perfection—Riverside groves

full of life the year around with but little danger of being injured by cold. Sheltered by the mountain ranges which shut off the cold winds from the north and east the trees blossom and mature fruit during every month of the year. At the same time the mild California climate gives the fruit a delicious flavor and a high keeping quality. This keeping quality makes it a desirable commodity for the men intermediate from the grower to the consumer to handle without excessive loss through its perishable nature. Next to, though hardly secondary to climatic conditions, are the soil suitable for the growth of the trees and a supply of good water to irrigate the trees through the dry months of the year.

In the past there have been numerous times when it has seemed as though the industry were doomed to eventual destruction or at least to a limited production only on account of the competition with fruit produced in foreign countries on low priced land and with cheap labor. The importance of this factor in

the past has been reduced through the operation of a tariff which encourages the production of the fruit and also through the organization of the growers into co-operative associations for the better handling of the fruit from the tree to the market. Two years ago the tariff duties on lemons were reduced approximately one cent per pound. Oranges, grapefruit, limes and other citrus fruit were reduced one-half cent per pound. The rates of duty on all citrus fruits are now on the basis of 35 cents per box of California capacity, approximately one-half cent per pound. At the present time the lemon industry is confronted with increased importations of foreign lemons and low prices. The increase in the quantity imported is due to the reduction of the duty on lemons and also to the shutting off of some of the principal markets for Italian lemons in Europe. Foreign orange growers, who are now not marketing their fruit in this country to any extent, are also seeking to bring their fruit into this country. This de-



A tropical vista backed by snow-capped hills—Redlands Orange groves

sire is due to the demoralization of their markets through the war.

There were many difficulties which confronted the growers when the methods of growing, harvesting and marketing were not as clearly outlined as at present. In the early history of the industry there were few precedents to follow from other lines of fruit handling which were applicable to the orange and lemon in California. The early efforts of the growers were often attended by mistakes. Experience was a costly teacher in eliminating those practices which were detrimental to the fruit and trees. The groves sometimes had been planted on soils which were not adapted to citrus culture; locations were chosen which were subject to frost, where the supply of water was inadequate, or where other unsuitable conditions prevailed. The handling of the soil under irrigated conditions had to be studied. The maintenance of its fertility through the planting of cover crops and the adding of humus was not fully appreciated. Scientific pruning was not practiced. The benefits to

be derived from the selection of buds from trees of desirable production were then not fully understood. These conditions, however, do not now prevail. The growers of citrus fruits in California are men of the highest intelligence and are in close touch with the progress made in agricultural matters. The cultural methods in use are continually improved. The fruit is handled with more care and skill than is used with any other fruit crop. Improper handling is becoming a less and less important factor and the best trade in the retail markets has confidence in the better brands of fruit.

The relative standing which the industry has attained in California in comparison with the industry in other parts of the world will be apparent from the following data: The total citrus fruit crop of the world equals from ninety to one hundred million boxes of California size. The five most important countries in the order of their production are: The United States, Spain, Italy, Japan, and Palestine. The United States and Spain each pro-

duce approximately 30 per cent, or 68,000 carloads, Italy 25 per cent, or 58,500 carloads, and Japan and Palestine each less than five per cent of the world's production. Of the total production of about 68,000 carloads in the United States during the season 1913-14, over 48,000 cars, or 70 per cent of the total, were produced in California. A normal crop in California from the present acreage of bearing age would yield from 55,000 to 60,000 carloads of fruit and the lemon acreage now set out will produce, when in full bearing, more lemons than are now consumed in this country.

Citrus fruits are picked, packed and shipped from California during every month of the year. The different varieties of oranges have seasons which cover the entire year, and a lemon tree blossoms and bears fruit of all sizes continuously. During a normal year, the comparative importance of the different varieties of oranges with their approximate shipping season is as follows: Washington Navels, 27,000 cars, shipped principally in December and January from Northern and Central California, and from December to June, inclusive, from Southern California; Valencias, 12,500 cars, shipped from June to November, inclusive, though this total is increasing on account of heavy plantings; Seedlings, 1000 cars, and Mediterranean Sweets, 2000 cars, shipped from March to July, inclusive. Other varieties, including St. Michaels, Thompson's Improved Navels, Ruby Blood, Malta Blood, Jaffa, Tangerines, and Navelencias, amount to about 1500 cars. Lemons are shipped the year round, the heaviest shipments going forward in May and June.

HOW THE INDUSTRY HAS BEEN DEVELOPED

To bring the industry to its present size has required men of ability and capital to develop the land and bring the groves into bearing. Those who have been largely responsible in bringing new capital into the industry have been in many cases retired business or professional men, and some who have come to California to regain their health. These men have brought into the industry business habits and

a wide experience which have been invaluable in building up the organizations which handle their products and which are second to none in the handling of a perishable agricultural crop. A charm is found in the culture of citrus fruits which can not be found with other outdoor pursuits. There have been attracted to the industry a class of people representative of progressive industry and occupations from all parts of the United States and from foreign countries. These men and women have been able to find the same opportunities for profit in this industry as are found in comparable industries in any part of the United States. As a class, the citrus growers of California are the most intelligent and enterprising agriculturists to be found in the world.

It is undoubtedly true that California has attracted many to the business of growing oranges and lemons principally for the name of "owning a grove." There are many people who often say, "I understand an orange grove does not pay." As in all lines of business, it is the individual himself who is the factor of greatest importance in determining the success of an enterprise. The personal factor determines the difference between profit and loss. As in any other business, the successful man must bring to his work a thorough knowledge of each and every phase of the industry, combined with a settled purpose to succeed in spite of all difficulties. A love for his work will bring success through the observing of the small as well as the large factors.

The second series of factors which have been instrumental in the building of this business are the organizations which have been formed in the industry. These have been formed primarily for the better handling of the fruit from the trees to the retailer in the consuming centers. In the early history of the business, as in other agricultural industry even at the present time, the business was transacted through men who had no direct interest in the welfare of the growers. These men might be buyers who purchased the fruit from the grower on the tree as cheaply as possible.

They then picked, hauled, packed and shipped it on their own account. Their interest lay in paying the lowest price for the fruit and in obtaining the highest price in the market. The grower's interest concerned itself with securing the maximum amount for his fruit on the trees. He did not concern himself with the extension of markets and other factors which affected him only indirectly. Then there were men who handled the fruit on a commission basis, charging a fixed price for handling it, selling it, and returning the net proceeds to the grower. Both of these classes of men in many cases advanced money to the grower on the security of his crop. In this way they obtained control of the fruit and handled it as they desired. This method of doing business proved so unsatisfactory that the owners of orchards found it necessary, in order to safeguard their investment, to band themselves together. They built their own packing house or leased a house. They handled their fruit co-operatively and endeavored to sell it to the best advantage for their own account. With the small volume of fruit ordinarily controlled by one grower it was practically impossible for him to market his own crop.

But even in thus forming themselves into one organization the growers found that a small volume of fruit could not be sold to the same advantage that a large volume could be marketed. The packing associations in one district then federated into a local selling association. This association had control of the fruit in the car from the time it left the packing house until its final sale to the jobber. The next step in organizing the business of marketing their crop was the formation of a central clearing house of market information. This central exchange covers the entire State, including packing houses and selling exchanges in the various districts. It maintains an office at some central city in the State, and maintains agencies in different parts of the country to look after the fruit when it arrives in a market.

Practically all of the growers' organizations handle the fruit at cost, distribute no profits

and accumulate no surplus. There are several state-wide organizations, having packing houses in various parts of the State and a central office through which the business transactions relating to the marketing of the fruit are handled. The methods under which they operate differ widely. The largest organization is organized to handle the grower's fruit at cost and its contracts encourage the extension of the co-operative principle. Space will not permit a detailed description of the business methods of the different types of organizations. In the case of the organization which handles over 60 per cent of the fruit shipped from California the costs are distributed equally among its members based upon the number of boxes of fruit each has handled. In the case of the other state-wide organizations some of the charges are made on a fixed price per box and other expenses are pro rated. In other cases the fruit of the growers is handled through the packing house of the corporation at a specified price per box to cover packing expenses plus a percentage on the gross amount realized, or at a specified price per box to cover packing and selling expenses. The quantity of fruit now purchased outright from the grower by a packer at a set price per hundred pounds for all fruit on the tree, or on some other cash basis, is but a small proportion of the total. The competition between the packing houses operating in various ways in a district has tended to reduce the cost of operation. They serve a useful purpose in their rivalry among themselves for the grower's fruit. The grower under these conditions has the opportunity of shipping his fruit in the manner which most appeals to his judgment and suits his particular conditions.

WORK OF THE CITRUS PROTECTIVE LEAGUE

In addition to the problem of marketing the fruit successfully there have arisen various other questions in which the industry and each grower has had a common interest. These questions included railroad rates, tariff duties, public policy questions, legislative enactments, and other general questions which affect the whole industry. In order to handle these prob-



Palm bordered canal for irrigating in Southern California

lems the individual grower shippers and packing houses, as well as the selling organizations, formed the Citrus Protective League. This organization has been successful in protecting the interests of the industry in these various general questions. It has enabled the industry to present a united front against the encroachments of transportation companies and against foreign importers who endeavored to have tariff rates reduced. It has assisted in building up the College of Agriculture of the State University by securing appropriations from the Legislature to enable them to handle research and other questions which make for better cultural methods, disease control, or improvement of fruit. It has secured the co-operation of the Federal Government in solving questions which have been a menace to the profitable operation of the orchards and has served as a medium through which it has been possible for the industry to express itself on questions which affected it as a whole.

During the time that the industry was being established on a firm basis the marketing question was the most serious with which the

producer had to contend. In solving their handling, marketing and transportation questions the growers were immeasurably benefited by the organizations which they themselves formed in order to get the benefit of co-operative effort. No amount of energy or money expended in perfecting organization, handling or transportation would have been of avail had it not been for the superior quality of the fruits which the growers produced. This fruit had to be sold to the consumers in the eastern part of the United States in competition with fruit brought from Europe, the West Indies, and other parts of the United States. One of the prominent Eastern fruit trade papers, published in a market which in importance overshadows all other markets of the United States, is quoted as follows:

"There is no disputing the fact that when it comes to extracting top-notch prices out of the buyers' pockets, the California orange has the call, first, last and all the time. Florida may talk of its dusky, celebrated India River fruit; the West Indies may put forth claims

of her yellow-skinned globes of sweetness, but the Golden State, with an orange which combines beauty with savor, and appeals to the eye as powerfully as to the palate, unquestionably wears the crown."—*Fruitman's Guide, New York.*

These inherent qualities of the fruit are found to be associated with certain varieties such as the Washington Navel orange, the Valencia orange, and certain other varieties of the orange as well as in lemons. These qualities are not found to be associated to as great an extent with similar fruit produced in other localities. The Washington Navel with its high flavor, characteristic trade mark, ease of handling by the grower, packer, retailer and consumer has achieved a place in the consumer's menu which will be permanent as long as these qualities endure. This particular variety, in common with the Valencia orange and other California oranges, can be used in numerous ways by the consumer in which it is not possible to use other oranges. They can be easily peeled, sliced for salads, or used as other sliced fruits are used. They

have an attractive color and appearance and a higher proportion of those health giving qualities for which acid-bearing fruits are noted.

THE GROWER'S TRIUMPH IN MARKETING

Regularity in supply and uniformity in price encourage the use of a produce. This has been found to be a fact in the experience of great concerns who have observed their product closely from the time it left their establishment until it reached the hands of the consumer. In the case of the California orange and lemon it has also been found that the associations in striving to supply all markets equally at all times of the year have been rewarded by a steady demand for their product. The householder has come to feel that at all times there is available at a reasonable price a fruit which can be depended upon to give satisfaction. Regularity in the supply of these fruits has been the factor which has gradually and surely reduced the price to the consumer and at the same time has increased the amount received by the producer. In the words of Mr. Charles J. Brand, in charge of



Cement flume for conducting irrigating water through an orchard



When the golden harvest is ready—Picking Oranges in California

the Office of Markets of the United States Department of Agriculture:

"They have given the country better fruit without increasing the cost to the consumer, and at the same time have increased their profits. They have also brought about greatly reduced freight rates on their products and more uniform prices have been maintained than would otherwise be possible."

When California supplied but a small proportion of the total quantity of citrus fruits consumed in this country, the price of the fruit fluctuated greatly from month to month and even from week to week. As had been found in numerous other commodities, the retail price is very much slower in responding to lower price levels in the wholesale price than it is to increase when the cost to the retailer is increased. Consequently, on account of the relatively higher retail price, consumption is restricted and the producer does not receive the full benefit of the reduction in the price to the jobber. Under the present method

of supplying all parts of the country regularly with fruit, the retailer is enabled to handle it on a strictly merchandising, rather than on a speculative basis.

GIVING AMERICANS A HOME-GROWN LEMON

The lemon business of California has gone through a number of ups and downs. When the growers first commenced to ship lemons in commercial quantities they had to contend principally with the difficulty of handling the fruit in such a manner that it would arrive in sound condition in the market and not be subject to serious decay while in the hands of the retailer and consumer. Investigations disclosed the causes of these decays and the growers placed in the markets a high quality of fruit in sound condition. It then was necessary to establish in the minds of the purchasers the fact that California lemons could be delivered to them in sound condition and thus overcome the prejudice in favor of imported lemons. In the course of time this was accomplished and now the California lemon out-

ranks the imported lemon and is taken in preference when other conditions are equal. The superior pack and keeping quality of the fruit when it arrives on the market in competition with imported lemons has assured California a market for its produce in the United States.

TRANSPORTATION PROBLEMS

One of the greatest factors in increasing the number of people supplied with California oranges and lemons has been the transportation companies. The industry long ago would have reached a point which it would have found impossible to pass without the co-operation of the railroad companies in furnishing suitable equipment, in making improvements in their methods of transporting the fruit over the high altitude and warm, low valleys and protecting the fruit from the extremes of heat and cold in winter and summer in the northern and southern parts of the United States. Among some of the large financial savings made to the growers by the railroads can be mentioned the reduction in the freight rate on oranges from \$1.25 to \$1.15 per hundred

pounds. Other savings which were obtained through the efforts of the industry are the reduction in the lemon rate from \$1.15 to \$1.00 per hundred pounds, the rate of \$7.50 per car which permits the shipper to load and ship pre-cooled and pre-iced cars of oranges at a large saving over the heavy cost of standard refrigeration. In considering the future of these rates it is not too optimistic to assume that as the volume increases it should be possible for the transportation companies to increase their efficiency in the handling of this great crop and possible for them to transport and care for the fruit in the car at a lower net cost per hundred weight. One of the features in the transportation of citrus fruits is the so-called blanket rate under which practically all the territory east of the Rocky Mountains to the Atlantic seaboard is supplied at the same rate per hundred pounds for freight. This permits a very wide distribution of these fruits to all parts of the country.

The Panama Canal has opened up to the industry another means of transporting the product. What these methods of reaching the



Fumigating a Lemon grove



Interior of Packing House, Duarte-Monrovia Fruit Exchange



Orange Display, Auction Room, Erie Pier, N. Y.

Eastern seaboard markets under lower transportation rates will accomplish for the benefit of the growers will be determined in the future after rates have been made and the practicability of using water transportation has been determined. It is expected that during the present season enough fruit will be forwarded in this manner to demonstrate the practicability of using the Panama Canal.

RESULTS OF RESEARCH AND EXPERIMENT

In solving the difficulties which have confronted the growers and packers the Federal and State agricultural departments have been of inestimable value to the industry. The Federal Department of Agriculture, through one investigation alone, has been the means of saving the growers and also the railroads millions of dollars which were formerly lost through the decay of oranges and lemons while in transit. The losses from decay which were being sustained by the industry had reached such an enormous total that the United States Department of Agriculture sent investigators to California to determine the causes of these losses and the methods of eliminating them. As a result of these investigations the method of handling the fruit in California has been revolutionized and it has been possible to reduce the losses from decay to a very small proportion of those formerly sustained. The work that is now being done by the College of Agriculture of the University of California and by the United States Department of Agriculture in investigating the methods of improving types of trees, in studying methods of management, and the handling methods now in vogue will prove of great value in solving those problems which are impossible for the individual grower to study and solve alone. Many of these questions will take years of study by trained experts and only in the institutions supported by the State or Federal governments can the men be retained who are capable of handling such scientific studies.

IMPORTANT ECONOMIC QUESTIONS

Up to the present time more attention has been given to organized and scientific marketing of the crop than to its economical produc-



Unloading oranges at packing house



How the oranges are conveyed to the packing house



A Lemon packing house, Upland



Lemon packing house that looks like a palatial residence—Santa Barbara



The younger generation—Baby Citrus trees

tion. The industry has grown at a tremendous pace and a great deal of attention has been given to the setting out of new orchards. A time has now come when the growers will devote an increasingly larger amount of attention to the scientific production of high-grade fruit at the lowest cost per box and to the utilization of a part of the crop in other ways besides selling it as fresh fruit. The imports of orange and lemon by-products, principally lemon, have amounted from \$1,500,000 to \$1,750,000 annually in the last few years, exclusive of marmalades. These imports have come from countries in which hand labor is cheap and plentiful, consequently the business has grown up along lines which it would be difficult, if not impossible, to follow in this country. With the development of methods and machinery to handle the various operations successfully, there will come to this State a by-product business which will utilize a proportion of the crop, varying according to the

market price of the fresh fruit. This will take out of the market a portion of the crop when there is an over-supply of fresh fruit and will act as a stabilizer for the price of fresh fruit.

There is also an unexplored field in the putting up of special packages of fruit to suit particular trades. In the European citrus industries there is a large and profitable holiday business in fruit packed in attractive wrappers and packages. The present size of the California package is too bulky for an ideal Christmas or holiday box, but with the development of a suitable package which can be shipped at a low cost in carloads in connection with other fruit and can be retailed at an attractive price in the market there should be an increasing demand for holiday packages. In this connection there are now in use by some packing houses small boxes containing a dozen oranges which are sold in California at a relatively high price. The price includes individual de-

livery charges from California to all parts of the United States.

From the production side of the industry a great deal of practical work is now being done to raise the standard of the trees in the orchard. This is being done by demonstrating the practicability of growing trees in the nursery, or rebudding them after they have been set out in orchard form and proven unprofitable, which will produce a high average yield per tree together with a high proportion of the better grades of fruit. Mr. A. D. Shamel of the United States Department of Agriculture, who is in charge of this work, has found that certain trees are habitual producers of a large amount of fruit coupled with a heavy proportion of the best grades. Through tests it has been found that these qualities are transmissible from the parent tree through the bud taken from it to the nursery tree or the rebudded tree. From a comparison of the best and poorest trees in one of the most productive groves of Washington Navel orange

trees in California during four seasons from 1911 to 1914, it was found that the average of the best trees was over four packed boxes per tree, while the average of the poorest trees was less than one box per tree. The returns per acre showed a difference of \$417.77 f. o. b. at the packing house, between the best and poorest trees. It has been found by Mr. Shamel that in many groves more than one-half of the trees are carried at an actual loss or are only paying their "board." The practical application of the improvement of orchard trees through bud selection is then made by top-working and rebudding these unprofitable trees in the orchard with buds taken from trees which are known to produce large crops of high-grade fruit. Trees which have been top-worked and rebudded in this manner, in over 90 per cent of the trees so handled, have come true to the type of the parent trees. In the case of lemons, they have produced as much fruit per tree in one picking as was formerly obtained from the same tree in a



A picturesque view—Orange groves from Point of Rocks, Riverside, Cal.

year. As lemons are picked from ten to twelve times in a year the total increase in the fruit secured shows a remarkable gain.

SERVICE TO THE CONSUMER THE PRICE
OF SUCCESS

In the last analysis the future of this great industry will depend upon the place it achieves in the minds of the ultimate consumer. No business can survive and flourish which does not furnish the consumer with a product which will give him satisfaction and keep alive the desire for the product. A great step forward in the direction of giving the consumer a product of the highest grade has been taken in the past year. At the beginning of the Navel orange shipping season from the northern and central parts of the State, the United States

Department of Agriculture suggested a ratio of eight parts of soluble solids to each part of acid present in oranges as one which should govern the maturity of oranges. The growers in the earlier sections of the State immediately adopted this standard and formed an association to supervise the testing and shipping of fruit. The good effects of this suggested standard in the comparatively short time that it has been effective has convinced the industry that it has been a decided benefit in making an improved market for California oranges based on the merit of the article itself. From a financial standpoint it has been very satisfactory, showing a greater demand and consequent higher price for California oranges as compared with other fruit on which this standard was not applied.



Like a veritable Garden of Allah—Orange district, Redlands



Ripe Olives

The Olive: A Unique California Product

By Mrs. Freda Ehmann

President Ehmann Olive Company

Editor's Note: Mrs. Ehmann, who long ago led in pioneer olive planting in her district and laid the foundation for one of California's best known producing enterprises, which bears her name, gives conclusions drawn from long and large experience in the growth of the olive tree and the products upon which its present popularity rests. Interesting historical references carry the reader from the introduction of the trees by the padres to the industrial importance which they have now attained.

THE olive industry in California in its beginning and rapid development is one of the most interesting chapters in the history

of horticulture. When we remember that the ripe olives of California and California oil are practically new products, and even up to

this date almost unknown articles in a large portion of the United States, and when we consider the present large demand for the ripe olive, we must acknowledge that few, if any, branches in husbandry have made such phenomenal growth within the same period of their existence.

PLANTING OF FIRST OLIVE TREES

From fairly authentic sources we learn that in the year of 1769 Don Joseph de Galvez, acting under royal Spanish orders, commanded an expedition to re-explore the Pacific Coast, landing in San Diego in the same year. Accompanying Don Joseph de Galvez on this important voyage we find Father Junipero Serra, a Franciscan monk, and afterwards founder of the California Missions. Don Joseph de Galvez brought cuttings and seeds of figs, pomegranates, oranges, citron, dates and olives. These were planted in the grounds surrounding the Mission buildings and under the favorable soil and climatic conditions of California these trees changed the heretofore wild grounds into a beautiful semi-tropical garden. However, of all the flowers and fruit which delighted the eye and palate of those missionaries there are no traces to be found. Only the olive trees and a few palms have weathered the storms of over a century. At the present day there are still eighty olive trees, survivors of that first planting by Father Serra, to be found in the old Mission grounds near San Diego.

A careful examination of the data at hand does not mention the preparation of olives as an article of food at that time. However, the olive oil is frequently mentioned as being used in religious ceremonies and in the household of the Mission fathers.

We are at a loss to explain why so many years should elapse ere we read of the spreading of the olive culture and why the production of so highly esteemed an article as olive oil is in the Catholic Church and Catholic ceremonies, should fall into decay. Not until the year of 1841 do we read of various small groves of olive trees being planted by California ranchers. In the year of 1872 the first attempt was made to put the olive industry

on a commercial basis. A considerable acreage was planted in San Diego by Mr. Frank E. Kimball, at Santa Barbara by Mr. Elwood Cooper, and in San Jose by Mr. E. E. Goodrich. The olives raised by these pioneer growers, however, were all converted into oil. The prevalent supposition that olives could not be raised successfully in the northern part of this State was soon dispelled by the planting of large tracts of land in the San Joaquin and Sacramento valleys as far north as Shasta County. The present conditions of the groves in the section here mentioned is the best testimony for the writer's assertion on this point.

It is a matter of conjecture as to whom we are indebted for the preparation of the first ripe olives as a condiment. However, it is an indisputable fact that with the evolution of this wholesome food from the crude method of the home product to the scientifically finished commercial article, the olive industry of California owes its present flourishing condition, entirely and solely.

FACTORIES ESTABLISHED

After the first successful introduction large factories were established for the pickling of the ripe olive, and money and labor were freely employed to introduce this new article in California as well as in Eastern markets.

This agitation could have but one result, and that was to create a phenomenal growing demand for more ripe fruit. The attention of investors was at once attracted to this new branch of horticulture. Whole sections of land were colonized, sold and planted for the cultivation of the olive. Capitalists from all over the United States are paying handsome prices for groves already in bearing and at the present time the olive culture has undoubtedly passed the experimental period and is based on a solid foundation as one of the best and surest investments. Perhaps it is not out of place here to state that the foregoing assertion depends on the following conditions:

Good gravelly soil, sufficient drainage, plenty of water for summer irrigation and fertilizer to stimulate the growth of trees and development of the fruit. Planters make a serious mistake not to heed this advice, as the

writer's experience is ample proof for the above assertion.

Olive trees should be planted about forty feet apart. This insures the bearing of larger and earlier matured fruit. Where trees are crowded, say sixty to sixty-five to the acre, the fruit will invariably mature late and remain undersized. Especial stress should be laid on this point, as experience has taught the writer much that she did not know when she most needed such knowledge.

The so-called Mission variety of olives has proven the best for pickling and oil making. It is a good bearer and a much hardier variety than some which are larger. These olives contain a large percentage of oil and when properly prepared have a delicious, nutty flavor which is entirely lacking in some other varieties, or in the Mission olive when poorly prepared.

Much discussion has arisen of late by some olive growers who claim to have discovered a method of cultivation by which young olive trees will bear fruit the second and third year after planting. There may be a few such trees which were budded on three or four year old roots, but the writer's experience of twenty-three years is that it takes from five to six years before an olive tree bears fruit to any extent. It is not advisable to plant stock less than two years old. The growth on such stock is slow and the time to wait for fruiting is long, but to overcome this tedious waiting, planting of deciduous fruits, such as peaches, plums, pears, or berries may be made between the rows of olive trees. These deciduous fruits will, after the third year, not only bear the expense of caring for the olive groves, but will yield a net profit to the investor until the olive trees require the entire ground space.

Olive trees increase in bearing very rapidly with age. A full bearing orchard under good conditions will average from two to three and even four tons per acre. Figuring the fruit at our present market prices of from \$100 to \$140 a ton, it is easy to see why I consider olive culture by far one of the best industries in California for profitable, present and future investments.



Preparing olives for the trade

We must not lose sight of the most important feature of olive culture and that is the longevity of the trees. The writer was shown olive groves in Italy over 700 years old, according to authentic information. These groves were all on rocky hills where no irrigation or cultivation was possible and yet they yielded year after year fine crops of fruit. Therefore when an olive orchard is being planted it represents a permanent income not only for the present owner, but for future generations.

There is one more reason, not to be considered too lightly, why I am making this claim for the olive culture, and that is the fact that only two states in North America, namely, California and a small portion of Arizona, are suitable for successful olive raising, and while California deciduous fruits rank very high, there is a keen competition existing between Oregon, Washington and Idaho fruits, all also of excellent quality, whereas the olive has no competitor, and has the United States and the whole world for a market.

We are just beginning to convince the American housekeeper and dealer that California produces a far superior olive oil than the imported product. Those who are experienced in the use of the California olive oil

prefer it greatly to the imported oils because of the rich fruit flavor which is altogether absent in the nondescript thin Italian and French oils. A growing consumption of California olive oil will naturally stimulate and encourage olive culture more than lecturing or writing on this subject can do.

In summing up the prospect of the ripe olive industry of California it is within the writer's knowledge that there are few, if any, olive groves in favorable localities that are for sale, while on the other hand whole sections of foothill land are being bought up by

individuals and corporations and planted to olives.

How much of beauty and sentiment could be introduced into our beautiful State of California if her highways and hill slopes were all planted with these beautiful trees. There is no more beautiful sight than an olive grove with its soft-tinted, silvery leaves reminding us as no other tree does, of sacred history, and connecting California of today with the lives of those noble missionaries who left us in the olive trees, a blessing and a heritage for the present generations.

"The Fruit of Peace"

By William Jennings Bryan

Secretary of State, U. S. A.

(Editor's Note: March 31 of the present year was designated "Ripe Olive Day" at the Panama-Pacific exposition and nationally the occasion was observed to a considerable extent. While primarily the object might have been to promote the olive industry in California, there is a higher purpose, which is set forth in the following letter, written prior to the above date to Mr. George C. Masefield of the California Ripe Olive Day Association, by Secretary Bryan, who awarded the verdict to the olive in the mooted question as to whether the dove or olive branch should be the emblem of peace.)

THE olive is the hardy tree which survived the deluge, and when the dove carried his message to Noah it was a tribute to the tree as well as a message of peace. The olive branch from time immemorial has been associated with the dove as emblematic of peace; but as the fruit is greater than the branch, the California ripe olive should have its fame linked not only with peace, but with prosperity and abundance. . . .

I am one of the few living outside of California who has had a long and intimate acquaintance with the California ripe olive, which I regard as a most delicious and wholesome food, and I shall be glad to join with you in the celebration of "California Ripe Olive Day" by partaking of the feast which the olive growers of California have made possible.

Why California Will Lead *in* Fig Production

By George C. Roeding

President Fancher Creek Nursery Company, Fresno; Ex-President Pacific Coast Nurseryman's Association and California Association of Nurserymen, etc.

Editor's Note: Mr. Roeding has occupied a leading position among California fruit growers for a double decade, not only for his productions but for his zeal and energy in solving problems which were for years baffling in the introduction and establishment of the "fig of commerce" in this State. He co-operated with the United States government in the successful installation of the fig insect which is essential to the production of the Smyrna fig, and personally took part in the exploration precedent to that result. He now leads in the production of that type of fig and its entry to the world's trade. His article presents one of the most dramatic phases of the California fruit industries.

IN RECENT years no horticultural subject has created more interest or has been the cause of more discussion and variance of opinion than the possibilities of fig culture in California and particularly in those sections where the summer temperature ranges from 90 to 110 degrees in the shade from July to October, with an entire absence of rain, and a comparatively dry atmosphere, which are the necessary requisites for making commercial fig culture a success. This does not necessarily mean that figs can not be grown elsewhere, but rather that where conditions such as these prevail every branch of the industry is open to exploitation, from the shipping of fresh figs to the canning and preserving and finally to the drying, which must be, after all, the only absolute and dependable method for the disposal of the crop when largely grown. Figs have been marketed in this manner for hundreds of years, and although we do not wish to minimize canning, preserving and crystallizing figs, these processes will only take care

of a very small part of the crop, when it takes its place as one of the great fruit industries of this and other states having the climate and soil conditions and the possibilities of irrigation similar to our own.

The annual production of Smyrna figs in Asia Minor varies from twenty-five to thirty thousand tons, and at least one-half of this crop is sold in the United States. The output in the United States, all—or practically all of it—comes from California, and is from three to five thousand tons annually.

WHY HAS THE FIG INDUSTRY DEVELOPED SLOWLY?

Figs have been grown in California for upwards of one hundred and twenty-five years, and unquestionably the fig industry, in the natural course of events, considering the thriftiness of the trees and their remarkable productivity, should have led all other fruits in commercial importance.

What, then, has been the reason for the exceedingly slow progress which has been

made in the building up of this business? The answer is a simple one—not having the right variety. We do not detract from the value of other sorts which have been growing in California for a number of years, but the great world's supply of figs is secured from none of these varieties.

For years the White Adriatic, White Endich and a few other figs were manipulated by every process which human ingenuity could devise to make them compare favorably with the world-famed Smyrna figs of commerce, but all the efforts were in vain to secure the delicious, nutty sweetness which has placed this Oriental production in the lead of all other figs. Smyrna had managed to control the situation for so many hundreds of years that the growers there, and horticulturists in other parts of the world, were convinced that a certain combination of soil and climatic conditions made the Valley of Maeander the only spot on earth where the fig could be grown to perfection. It remained for the progressive, enterprising and persevering horticulturists of California to demonstrate the fallacy of this preconceived idea. The first actual commercial demonstration of growing Smyrna figs was made on the Roeding place in Fresno County in 1901.

California will take the same place in the fig industry that it has in other lines of fruit growing; not only will the consumption of figs increase at an astounding rate in the United States, but we shall be shipping our figs to Europe, Australia, China, Japan and many other countries of the world, so the outlet for this product is practically unlimited. It is an actual fact that more than half our dried apricots and prunes are being exported to Europe, with an ever-increasing demand. Then why should not the same condition of affairs arise with the fig?

As with other fruits, our improved methods of handling are already apparent in our dried figs, for they are sweeter, have a much finer flavor, and the cleaner methods which we follow in the curing of our product will combine to place us in this, as well as in other branches of the fruit industry, in the temple

of fame, as the leaders in all of our commercial fruit undertakings.

THE SMYRNA FIG

What is, after all, the essential point of difference between the genuine Smyrna fig of commerce (termed by us the Calimyrna) and the other varieties of figs grown in California? It lies in the fact that the Calimyrna contains nothing but female flowers, and that unless they are pollinated either artificially or through the agency of the fig wasp, the fruit never reaches maturity, but shrivels and drops from the tree when one-third grown. The Adriatic type, of which there are fully one hundred varieties growing in this State, contain mule flowers, some female flowers, but which nevertheless develop and mature edible fruits, although the seeds are sterile. The Calimyrna fig, on the other hand, is valueless unless the flowers have been caprifigged.

CAPRIFICATION IS SIMPLE AND EASY

To all outward appearances the fig tree, unlike other trees and plants, develops without first producing flowers. But these appearances are misleading, for on cutting the fruit open, it will be found that it contains a large quantity of inconspicuous flowers closely grouped around the rind, which is really the receptacle for them. Furthermore there are four distinct kinds of flowers found in the fig, namely: Male, female, gall and mule flowers. Male, female and gall flowers are found in Capri or wild figs, the number varying in greater or less degree in the various crops. Male and female organs, as every one knows, are common to all the more highly developed plants; the gall flowers, however, are abortive pistillate blossoms, which nature has provided as a home for the fig wasp.

Bear in mind always that the Capri figs are a class in themselves and serve only one purpose, and that is to provide a home for the little wasp, *Blastophaga grossorum*.

In the crop of Capri figs maturing in June, technically the Profichi crop, and it is the same in the succeeding crops, the fall, or "Mammoni," and the over wintering crop, the "Mamme," the propagation of the fig wasp takes place in the following summer.

The Profichi crop is the only one about which the grower must give himself any concern. It contains an abundance of staminate or male blossoms which are mature, covered with pollen when the little wasp emerges into the world to diligently perform her functions and add one more link to that peace of mind which we, poor humans, are seeking for. Nature has provided each of these figs, which contains, according to its size, from five hundred to two thousand wasps, its quota of male and female insects. The wasp develops in the following manner: The male is wingless, while the female is winged. The male always emerges from the gall first, crawling around the Capri fig, pierces the gall containing the female with its powerful mandibles and impregnates her. She then enlarges the opening made by the male, and in passing out of the fig comes in contact with the male flowers surrounding the orifice, which are then mature from June 10 to July 1, and gets her body and wings dusted with pollen. At this stage, which is readily determined by breaking open a fig, for the insects, both male and female, will be found crawling inside, the figs are picked off and hung up in the Calimyrna trees. Within a very short time the workman knows by the outward appearance of the fig that it has reached the proper stage of ripeness.

The complication which many people imagine in connection with the distribution of the Capri figs seems ridiculous when it is borne in mind that the ignorant peasants do the work in Smyrna without having the slightest conception of the matter, or knowing the male from the female insects. All they do know is, if they do not have this "bug" their crop is a failure. With all their ignorance they harvest close to thirty thousand tons of figs annually and the failure of a crop is unknown there. Climatic conditions are not as favorable there as here, for it is often very much colder in winter. If the winds do not happen to come from the north in the summer it remains cool, and early rains cause the crop in some seasons to be seriously damaged.

Caprification of the Calimyrna figs extends through the month of June. At this time

the figs are about the size of marbles, or slightly larger, and in breaking the figs open the flowers present a waxy white appearance.

Fortunately all the Capri figs do not mature at the same time, nor are the Smyrna figs receptive in a single day, otherwise in large holdings it would take a big force of men to carry on the work. In four or six year old trees, from six to fifteen Capri figs should be hung in each tree, but if there is a plentiful supply of infested Capri figs it will do no harm to suspend a larger number. Trees from ten to forty years old will require from twenty to one hundred figs to each tree. The cost of caprifying is a small item of expense; trees from four to eight years old will graduate from 25 to 50 cents per acre, and in older orchards the expense has never exceeded \$1 per acre.

HOW CAPRI FIGS ARE DISTRIBUTED

The Capri figs are gathered in buckets and then transferred to sacks. They are picked off where they can readily be reached from the ground or are knocked off from the tree with bamboo poles when beyond reach. This work should start at daylight when the figs are cool, for the flight of the insect commences just as soon as the individual fruits become slightly heated by the sun's rays and continues with interruptions for several hours, covering a period of ten days from a single fig, and occurs at about the same time each day, until all the wasps have made their escape.

In former years the figs after gathering were strung on raffia fibre and distributed throughout various parts of the Calimyrna trees. This is a tedious and rather slow undertaking, and the work has been very much simplified by hanging a wire basket made of one-inch poultry netting, in the trees. These baskets are a permanent fixture, are three inches in diameter at the top, ten inches long, narrowing down toward the end.

Many growers use strawberry baskets for the distribution of the figs. There is no objection except that they must be renewed each year. One wire basket is sufficient for a tree, unless it happens to be a very old one.



Irrigating a California Fig Orchard

Unlike many other fruits, the fig in order to produce a high-grade article must be allowed to remain on the tree until it loses its original form, shrivels up and drops off. Sometimes it is necessary to jar the trees slightly, if the shriveled figs do not drop, or knock them off with light bamboo poles. From the orchard they are hauled to the drying ground, which should either be a hard piece of ground or an alfalfa bed.

The figs are dumped on trays which are stacked at once, for, as a general rule, all figs—with the exception of the very large ones—are dried sufficiently so that when they come on the drying ground no further exposure to the sun is necessary. One of the universal complaints made about California figs has been their tough skin. This is not due to any unfavorable climatic or soil condition, but is the result of overdrying. The sorting of figs may be commenced two days after they have been placed on the trays. All the figs which have a slightly leathery feeling to the touch

are thrown into a pile by themselves in the drying shed, and the bird picked and split figs into the cull pile. These are not lost by any means, but sell readily at $2\frac{1}{2}$ to 3 cents per pound. The soft figs are placed on trays as before, the trays are stacked, and the figs remain on them until reaching the proper degree of dryness, when they are thrown in with the others. It is advisable to leave the figs in the pile, which may be from three to six feet deep without the fruit being damaged in the least, for a period of two weeks, turning the figs over with a scoop shovel at least once during the period or oftener if time will permit.

Just prior to delivering to the packing house the figs are given a thorough washing in a brine having not less than four ounces of salt dissolved in the gallon of water. A prune dipper is used to good advantage for this work. The figs should remain in the brine for a period of ten to fifteen minutes, depending on their condition. They are once more

placed on trays, two or three inches deep, exposed to the sun for half a day to allow the water to drain off and the trays are again stacked. Within two days they can be dumped into sweat boxes, and are ready for delivery. This processing not only cleans the figs, but it softens the skins, causing them to feel like a kid glove when squeezed between the fingers, and in addition to this, the fig presents a bright and most inviting aspect. They are a delight to the eye and appeal to the palate as no other fruit does.

DOES IT PAY?

Let us explain the management of a fig orchard, briefly. As far as clean cultivation is concerned the fig is no different from other trees. The first year trees should be irrigated at least three times during the summer months; in subsequent years, and up to the time the trees are five years old two irrigations should be given and in later years one irrigation is sufficient, and this should be given, if possible, between April 15 and June 1, to promote a strong new growth and a heavy setting of figs. The figs that are dried all set on the new wood. In localities where the annual rainfall is from fifteen to twenty inches or on heavy soil, where the trees are making a strong growth, and give no indication of being dry during the summer, the trees after reaching the bearing age need no irrigation. The pruning of a ten-year-old orchard should not exceed three cents per tree. The very outside cost, and this estimate is unusually liberal, for the entire care of a fig orchard, is \$15 per acre per annum. The harvesting of the crop, including the delivery to the packing house, will not exceed \$15 per ton, and where a farmer does all of his own work with the assistance of his family, even this figure would be high.

A five-year-old tree will produce enough fruit to more than pay for cultivation; at six years 1000 pounds, and at eight years 2000 pounds, and from this time on, as the trees develop, the crop will vary according to the attention and the consequent vigor of the trees, from 2000 to 6000 pounds per acre.

Good Calimyrna figs sell at 5 cents per pound in the sweat box, and as the industry advances in importance the figs will be sold on a basis of size and quality, the larger and better figs will bring even a better price than this. The grower who cures his fruit properly, grades out all small and inferior figs, will be entitled to a better price for such figs, and it will be paid him without any question.

Comments are very often made on the comparative bearing qualities of the White Adriatic and the Calimyrna, and the natural inclination of the average observer is to credit the former as being a heavier producer. Although to all outward appearances the White Adriatic may have more figs on the trees they will average far smaller in size, and in addition to this a sweat box which is eight inches deep by twenty-four inches wide and thirty-six inches long will weigh fully 15 per cent more when filled with Calimyrna than with the White Adriatic. The difference in weight is directly attributable to the larger sugar content and the fertile seeds.

Calimyrna figs have been shipped fresh by regular refrigerator service to New York, Chicago, and other Eastern points, and have netted growers 10 cents per pound.

THE FIG CROP SURE

A failure of a fig crop in California has never been known, and we will venture to say without fear of contradiction, it never will be.

Fig buyers are so certain of their ground in respect to an annual fig crop, that it has been a customary practice for a number of years in Fresno County to make from one to five-year contracts with growers for the crops on their avenue trees and for entire orchards, the purchaser paying in advance for the expected crop. The price paid depends largely on the size of the trees, but the contracts range from \$1 to \$5 per tree and it is no unusual thing for these contracts to involve sums as high as \$5000 per annum. The contractors bear all the expense of harvesting, and the grower merely prunes and cultivates his orchard under this arrangement.

The Date *in* California

By Silas C. Mason

Aboriculturist, Bureau of Plant Industry, United States Department of Agriculture

Editor's Note: Professor Mason has for years been the resident specialist who, under the direction of Doctor W. T. Swingle, has been charged with the supervision of prolonged effort to establish the best dates from the South and East Mediterranean region upon the great stretches of Southeastern California which are wrongly called "deserts." Professor Mason describes how these regions are rendered productive by date palms, with reference also to the growth of this historic and invaluable palm in other parts of the State. The article is technically correct and therefore of great value to those who wish authentic information as to this branch of agricultural activity.

THE production of dates in a commercial way should be carefully distinguished from the growth of date trees for shade or ornament. Also the date palm, *Phoenix dactylifera*, must not be confused with other species of the genus, one of the most common of which is the Canary Island palm, *Phoenix canariensis*, splendid specimens of which help to beautify so many residence lots in the coastal regions of California.

HISTORICAL SKETCH

The introduction of the date palm into California was undoubtedly a part of the indefatigable labors of the early Mission fathers, seeds of the date being planted in their Mission gardens from San Diego northward. As these were all comparatively near the coast and in sections of too low summer temperature for the successful maturing of fruit, it is probable that these plantings were made chiefly to afford leaves for the church celebration of Palm Sunday. There were a few seedling date trees grown on private estates in California; none, however, dating back to a very early period.

A lot of seedling trees in the Montecito district, near Santa Barbara, are known to be

over forty years old, and some in a private enclosure within the city limits are of nearly as great an age. The trees on the ranch of Mr. Hall Hanlon on the California side of the Colorado River below Yuma, and the trees on the ranch formerly owned by Colonel Sam Taylor at Winters, both mentioned by Mr. W. T. Swingle in the Yearbook, Department of Agriculture, 1900, are of nearly as early an origin.

The Wolfskill variety at Winters (See Plate LXII, Yearbook, 1900), was a variety of good quality and of such remarkable earliness as to mature its fruit in this sheltered position at the latitude of 38 degrees, 32 minutes, the most northerly locality where the date matures in the United States.

The first introductions of offshoots of named varieties of dates from the north of Africa were made under the direction of Professor H. E. Van Deman, then pomologist of the Department of Agriculture, who received in July, 1890, nine plants from the north of Algeria, fifty-nine plants from Cairo, Egypt, and, in 1891, six plants from Muscat, Arabia. Of these seventy-four plants thirty-six ultimately reached California and were distributed



Bringing the Orient to the Occident—A six-year-old Date Palm Tree in the Mecca Date Garden, United States Department of Agriculture

to the State experiment stations at Tulare and Pomona, Mr. F. A. Kimball at National City and the Southern Pacific Railroad Company, whose officers placed their share in the hands of Patrick Gale for planting on his ranch near Indio, Cal., the one locality of the four now known to be adapted to date culture.

One large tree, supposed to be of this original importation, is still growing in a neglected condition on what was the Gale homestead entry near Indio.

The survivals of the Tulare and Pomona plantings were moved to Mecca with the establishing of the department garden there in 1904 and three of them survived the removal, one, an Egyptian variety, being now the tallest tree in that garden.

The greatest advance made in California date culture was the establishing in 1904 of the Mecca date garden on a tract of land 185 feet below sea level, lying well down in the bed of the ancient Salton Sea. The first off-

shoots set were from an importation secured through Mr. Swingle, and later importations secured through Messrs. T. H. Kearney and D. G. Fairchild by the Bureau of Plant Industry of the Department of Agriculture. Algeria, Tunis, Egypt and the Persian Gulf region were drawn upon for their choicest varieties, until in 1914 more than one hundred imported varieties were growing in governmental stations on California soil.

The year 1904 marked the establishing at Mecca of a five-acre planting as a private venture by Mr. Bernard Johnson, and of a ten-acre planting by the California Date Company, a joint stock concern at Heber, Cal.

In 1907, in view of the impending submerging of the Mecca date garden by the filling of the ancient Salton Sea from the break in the Colorado River embankment, the Department of Agriculture established a new ten-acre date garden at Indio, at a point about twenty-five feet above sea level. The land

for this was deeded for the purpose by Mr. Fred N. Johnson, who had met with remarkable success in the culture of a small number of offshoots placed with him for trial by the department. The advance of the rising Salton Sea was finally checked when the water was within 200 yards of the Mecca garden, and the proposed removal of the young plantation to Indio became unnecessary. But the differences in soil and location were found sufficiently great to justify the continuance of both stations.

The planting of date seed was encouraged from the start and in 1907 the Department of Agriculture made its first distribution of seedling date plants to settlers of the Coachella and Imperial valleys, and large quantities of seeds of choice varieties have since been given out in small lots, the idea being that though the date does not "come true" from seed yet a considerable number of the seedling plants would produce fruit of value for home use and an occasional variety would appear of sufficient merit to warrant its propagation on an extensive scale.

By about 1910 the fine quality of the fruit produced in the Mecca, Heber, and Indio plantations began to attract the attention of not only the settlers in those valleys but of the real estate men, and a "boom" in date culture began which still continues. Along with legitimate and wholesome enterprise, which has resulted in the importation of considerable quantities of date offshoots from the Old World regions, promoters of stock-selling schemes have rushed in, sending out mail sacks full of literature and making the most extravagant promises of profits to the investors for their shares.

The real merits of a legitimate and promising industry have, to some extent, been brought into disrepute by schemes often based only on options on a tract of desert land and a few hundred seedling date plants of dubious value.

REQUIREMENTS OF THE DATE

The requirements of the date may be best considered under the heads of climate, water and soil:

Climatic requirements—The distribution of the date tree is limited to regions where the absolute minimum temperature does not fall below about 6 or 7 degrees Fahrenheit. Even temperatures as low as 12 to 15 degrees Fahrenheit occurring yearly would be too severe a check to permit of successful culture. Temperatures of 20 to 25 degrees Fahrenheit are withstood with little injury.

The date tree may grow in such cool summer temperatures as those of San Jose and Los Angeles where the mean temperature for the eight growing months of March to October is from 62 to 65 degrees Fahrenheit, but no fruit will be perfected. Intense and prolonged heat and a very dry atmosphere are the summer conditions demanded for fruiting the date. The only regions in California affording optimum temperature conditions for the date are the Coachella and Imperial valleys of Riverside and Imperial counties, and, a little less favorable, the Colorado Valley from the Mexican line up to Needles. Here the mean temperature of the eight growing months is from 75 to 80 degrees Fahrenheit, and except for short periods the relative humidity is very low, comparing closely with the great date regions of the Sahara. A few especially warm localities in the San Joaquin and Sacramento valleys may be expected to ripen early varieties of dates of second quality, and possibly the warmer parts of the Death Valley.

Water requirements—Contrary to a common impression, the date tree requires an abundance of water for its best development, though it is able to survive considerable privation. The most reliable observations show that about 125 gallons to 150 gallons per tree daily must be allowed for the warmer months; much of this is doubtless absorbed by the soil in conveying it to the trees. In the very sandy soil of the Mecca garden probably 150 gallons to 200 gallons per tree daily are consumed during the period of greatest heat.

Date trees are known near Indio which have survived several years without surface irrigation other than the slight rainfall, but the roots here penetrate a slightly moist stratum



Flower Cluster of Male Date Palm just emerged from sheath and letting pollen escape

at about twelve or fifteen feet and so maintain a precarious existence.

Irrigation waters containing alkali in solution that would be fatal to ordinary field crops may be applied to date trees with little, if any, injury.

Soil requirements—The date tree thrives in a great variety of soils, but in the great date regions of Egypt is usually found planted upon soils too sandy for the production of profitable grain crops, there yielding profitable returns while the richer soils adjacent are found more profitable for the growing of deciduous fruit, grains, and sugar cane.

For a sustained yield of dates from trees on sandy soils it is necessary to give them occasional applications of manure placed in trenches about the roots. The alkali resistance of the date was shown by Mr. Swingle (Bulle-

tin 53, Department of Agriculture), to be greater than that of any known farm crop, even barley. This fact renders available for date culture considerable areas of land in the regions mentioned that are slightly too strong in soluble salts for general culture.

In order to fruit abundantly the date palm roots must have access to a stratum of soil containing 1 per cent or less of soluble salts. Much of the alkali land of the Southwest contains much more than this and is unsuited to date culture without drainage. There are, for example, large tracts of land northwest of the Salton Sea in the Coachella Valley carrying too much alkali to permit of date culture. The date palm can, however, support, when well established, considerable accumulating of alkali at the surface of the soil, enough to kill almost all other crop plants.

In general, the safest date lands for the purchaser not thoroughly familiar with such soils are those that have demonstrated their ability to produce alfalfa, barley, or cotton.



Three female flower clusters

Heavy clay or adobe have in many regions been utilized for date culture, a selection of varieties best adapted to them being necessary. It should be kept in mind that soils with much heavier percentages of soluble salts can be used where the drainage is such that a flow of fresh water can occasionally be utilized to wash them out than where such drainage is impossible and the salts tend to accumulate rather than diminish.

BOTANICAL CHARACTERS

The date, with other palms, is endogenous, having neither true bark nor annual rings of growth. The trunk having no true branches, but only a terminal bud, the only means of propagation is by the removal of offshoots or suckers produced sparingly from the axils of the leaves during the earlier years of the life of the tree.

In flowering, the date is dioecious, the male and female flowers being produced on separate plants. The long flexible pinnate leaves reach in mature trees a length of twelve to sixteen feet, about fifteen or twenty new leaves being put out from the bud every year. In culture thirty or forty leaves usually form the picturesque crown, the older failing ones being cut away.

The trunk may reach at forty or fifty years old a height of sixty or seventy-five feet, with a diameter of not more than two feet. With these graceful, columnar trunks, topped by the feathery, leafy crowns, a grove of old date trees is a beautiful and imposing sight never to be forgotten. In years to come the date groves of the Coachella Valley along the line of the Southern Pacific Railroad will be a feature worth crossing the continent to see.

PROPAGATION

The date is propagated by seeds and by offshoots or suckers.

When seeds are sown the plants do not come true to the variety and about half of them will be males, worthless except for a small number required for pollination. The sex of the plants can only be determined when they flower, sometimes at two years old, often not for four or five or even eight or nine years under unfavorable conditions. The female

plants will vary greatly in the quality of the fruit produced, as a rule not more than one-fourth bearing fruit of a quality to warrant their being grown, but occasionally very fine sorts appear. The list of choice date varieties of the Old World is doubtless the accumulation of such seedling selections for many generations. In the regions of Egypt, where large numbers of seedling date trees are grown, the industry is much less profitable than where a few choice varieties are propagated from offshoots and the plantations extended as rapidly as these can be produced.

Offshoots or suckers may be produced on seedling trees at two or three years old. In cultivated varieties the offshoots on removal may often have several smaller offshoots already started. They are borne in the axils of the leaves, most abundantly near the ground, but in moist situations trees may produce them for several feet up on the trunk. Varieties differ greatly in offshoot production, but they usually cease bearing them at about ten or twelve years old, and the average progeny per tree is not more than six or eight. Three or four years must generally elapse after the pushing of an offshoot before it is large enough to remove for planting.

From this it will be seen how greatly the date tree differs from deciduous fruit trees, with which, by the means of scions or cuttings, each bud of the thousands produced is a potential tree of the variety. With the date, however, multiplication is very slow.

So far, the best efforts of American growers have failed to save more than half of the offshoots, either imported or home grown, so it will be seen why increasing the acreage of date plantations is slow and costly. Fortunately, recent methods instituted by the Department of Agriculture of forcing the rooting of offshoots by the application of artificial heat are promising a great saving, both in offshoots and in the time needed to establish them.

With the best methods of culture indicating about forty-eight or fifty trees to the acre, the setting of an acre of choice date trees calls for a large initial outlay. One male tree must be allowed for every thirty to fifty bearing trees



Male and Female Flowers of the Date Palm Magnified

for pollination, selected with due regard to flowering periods simultaneous with those of the fruiting varieties. (For details of removing offshoots, planting and pollination, Bulletin 53, Bureau of Plant Industry, United States Department of Agriculture, should be consulted). For assurance of success the water supply must be ample and unfailing, because the offshoots during their first season in the ground must be kept constantly wet. Irrigation daily or at the least every other day is demanded for the first few months till the root system is well established. Backward offshoots may need this constant attention through the heated months of the second season. From this it will be seen how futile it is to trust a date plantation in its early stages to a gravity canal system unless this can be supplemented by reservoir storage or pump irrigation during the intervals between "heads" in the canals.

DATE GARDEN MANAGEMENT

In introducing the date industry into California the high price of labor and the lack of

men familiar with date culture are two serious handicaps.

The date regions of the Old World have at command an abundance of low-priced labor, trained from childhood to the operations of the date grove. Not only is the cultural work of the date plantation done at a minimum cost, but what may be called the "by-products" of the date tree—trunks, leaves and fiber, can, by means of the same cheap labor, be employed in the building of houses and the construction of baskets, crates, rope, small cordage and numerous articles used in the native mode of life, thus affording a secondary return from the trees that goes far to meet the expense of culture. There is very little waste of the imperfect and low grade fruit, the impoverished people or the camels consuming all not of an export quality.

With the high-priced labor of the Western states and a market only for the first quality of fruit, a different system of management must be worked out. First of all, only varieties of such superior quality that will appeal to the

best trade should be planted; second, cultural methods using modern machinery must make a minimum of hand labor go as far as possible to offset the low-priced labor abroad.

The development of such practice and the training of men to a new industry require time and patience, such as were needed in building up the citrus and the deciduous fruit industries farther north. The discomforts of the long seasons of extreme heat which adapt a region to date culture make it the more difficult to induce competent men to remain with the work at the time when the groves need the closest attention.

The determining of the most profitable varieties has needed to be a work of great care and caution, and much still remains to be done. A mistake in selection of varieties is costly with any class of fruit, but especially so with the date from its costly stock, slow propagation, and the impossibility of "working over" any trees found unsuitable.

INSECTS AND DISEASES

No fungous diseases of a serious nature have appeared on any date trees in America. Two scale insects, *Parlatoria Blanchardi* and *Phoenicococcus Marlatti*, have been found on most imported offshoots, and rigorous quarantine and control measures have been enacted governing the introduction of offshoots into the United States and their transportation from one locality to another. The *Parlatoria* scale can be completely eradicated by fumigation and burning if careful follow-up inspecting is done. Eradication and not simply control of this scale is necessary under American conditions if date culture is to be profitable. The *Phoenicococcus* scale yields to treatment and, while its entire eradication may require considerable time, its control within limits not a hazard to the industry is a matter of vigilance and persistence.

HARVESTING AND MARKETING

Gathering and packing the date crop call for the greatest outlay of hand labor of any operation of date production. The choice should be made of varieties which ripen the

individual fruits rather evenly on the bunch, so that by cutting the stalk the whole bunch may be lowered from the tree while the fruit still adheres firmly and the ripening completed. Even with such varieties the picking from the strands, grading and final packing in cartons involves tedious work unknown to the Arabs, who finish the curing in drying yards under most unsanitary conditions, and tramp the dates in a sticky mass into date leaf baskets for camel transportation. The scientific and cleanly methods which have been developed by the Department of Agriculture date station at Indio have set a standard which will be followed by all date producers in California. The result with the leading variety, the Deglet Noor, is a product not excelled by the choicest French pack from Algeria, selling at very encouraging prices, even leaving out of account the fictitious prices sought to be established by interested promoters.

The dry so-called "bread dates" of the Orient, in numerous varieties and the staple food of thousands of people, are little known to the American public. Experiments with several of these sorts, particularly with the Thoory, show them to be well adapted to Southern California conditions, and tests made of the preferences of a good many people show that but little education is needed to establish a steady demand for these dry but appetizing and nutritious dates, far more easily cured and handled than the softer and more luscious sorts.

SUMMARY

While subject to serious handicaps and by no means a "get-rich-quick" proposition, the date industry of Southern California has come to stay. It offers a fair return for labor and invested capital to those who are ready to give close attention to mastering the details of a new industry; an attractive and healthful out-of-door occupation, in spite of the desert heat, and the satisfaction of offering to the public a toothsome and wholesome product produced under clean surroundings in place of dates packed under the unsanitary conditions of a Bedouin village.

California Almond Growing and Marketing

By George W. Pierce

President of California Almond Growers' Exchange

Editor's Note: Mr. Pierce, who has for years been a prominent almond grower in Yolo and taken an important part in growers' successful organization for sale of their product, gives a careful sketch of the almond industry, the conditions affecting it, the chief producing districts, the kind of almonds chiefly grown, and the relative amounts and selling prices of each kind. He also discusses the origin, methods, and achievements of the California Almond Growers' Exchange, showing the advantages of it to the almond industry.

INTRODUCED into California a half century ago the almond has worked itself into popular favor. Its early blooming period and its extreme susceptibility to destruction by late frosts unerringly limit the area of its successful production.

The almond originated and has been grown for many centuries on the shores of the Mediterranean Sea. It was most fitting that its introduction into America should have been in the great central valley of California. Here the conditions of soil and climate, of skies and of sunshine rival those of Spain, Italy and Palestine. Here, although handicapped by a high cost of production and a burdensome freight rate, the California almond grower has made himself felt in the markets of the world. The work has required skillful handling. The business may now be said to be on a fairly stable basis. The price of its existence, however, is eternal vigilance.

So much is now known of the almond that if an average amount of business forethought be employed in the selection of location, adaptability of varieties and care of the orchard, remunerative returns may confidently be an-

ticipated. Few if any sections will produce all varieties equally well. Each section must specialize as to varieties. No location where heavy fogs are prevalent during the maturing period is adapted to the growth of the almond. Thus one might go on to the end enumerating the conditions necessary for successful almond culture and eliminating those that would prevent success in the venture, and you will have left the characteristics of the great central valley of California. Add to this remainder of necessities, those peculiar types and conditions of soil necessary, and thousands of acres in the Sacramento and San Joaquin valleys will qualify. Insist on comparative freedom from frosts and cold winds, and many nooks in the foothills furnish the sheltered spots desired.

As an industry, the growing of the almond appeals to the orchardist for several reasons. After the tree reaches maturity it requires comparatively little pruning. It is as free from pests as any other orchard tree, and the pests that attack it can largely be disposed of, or have their injury minimized by a moderate outlay of time and money. The almond is a

long-lived tree, and when its crop ripens it is not perishable. This latter statement is not to be construed to mean that the almond can, with impunity, be left on the tree indefinitely, but that it will not be a total loss if left a week or more after ripening before it is gathered. These characteristics of the almond appeal to the practical orchardist who has suffered from the ravages of insect pests and the shortage of competent help at harvest time.

Almond growing is one of the great industries of the world. Its American branch is located in Central California. As such, this section has no competitors. It is in a class by itself. Here in its home of adoption, the almond has made marvelous strides. Many imported crudities have fallen by the wayside. Improved types have supplanted imported and less worthy ones. Application of the intelligence of the California almond grower to the business has resulted in improved methods of handling the product. The type of machinery used is the best in existence. European and Asiatic almond growers have learned this and are gradually adopting both our methods and machinery.

In round numbers the United States consumes about 8000 tons of almonds annually. Of these California produces about 2000 tons. Spain, France and Italy supply the rest. Until very recent years the output of California, as to varieties, was largely confined to the Languedoc and the Hatch varieties. Those known as the Hatch variety are the Nonpareil, the IXL, and the Ne Plus Ultra. More recently the Drake Seedling, Peerless and Texas Prolific have come into favor. These last named three produce a cheaper nut, but bear well,

and in some localities, more regularly than do the Hatch varieties. A large quantity of soft-shelled seedlings carrying local names are marketed annually. The hard-shelled seedling finds a market at the nurseries and in a cheap trade in certain localities. Bitter almonds, produced in small quantities, are eagerly sought after by nurserymen.

In actual selling value the Nonpareil, a choice table nut, leads in price. This is followed by the IXL and Ne Plus Ultra, at a price about one and two cents, respectively, below the Nonpareil. Following these in value are the Drake Seedling, Texas Prolific, Peerless, and others of that type at about five to seven cents per pound below the Nonpareil. A slight variation for or against one or more of these is sometimes realized. Hard shelled and bitter almonds sold in 1914 at from eight to ten cents per pound.

From the dome of the State Capitol, at Sacramento, with a good field glass on a clear day, one can locate almond growing sections that produce 90 per cent of the tonnage of almonds now grown in California. Large acreages of almonds have been planted that are not yet in bearing. California is destined to soon furnish a much larger percentage of the almonds consumed in America than it now does. The successful establishing of a state-wide co-operative selling agency has greatly stimulated the industry. No place on earth can grow a better almond than can California. If the American people will discriminate to a slight degree, in favor of the home-grown product, almond growing in California, which is now in its infancy, will attain great dimensions.

The California Almond Growers' Exchange

Previous to the year 1910 the growing and marketing of almonds in California was conducted on a basis usually characteristic of pioneer efforts, and growers had been chafing under the treatment received at the hands of the brokers in almonds. So great was the demand for relief that local selling organizations first sprang into existence. The first of these

so far as we can learn was the Davis Almond Growers' Association, organized in 1899. Soon after similar associations were organized at Brentwood, in Contra Costa County, and at Yuba City. At this time no state organization existed. There was no co-operation between the growers of the several almond growing sections. Each association was a competitor of

every other association. This made possible unjust discrimination on the part of the brokers. The result frequently was there were as many different prices for a given variety of almonds as there were sections producing that variety.

In the disposition of the output of the associations sealed bids were asked for. The opening and consideration of these bids was a momentous occasion on the part of the associations. They were acting in good faith, endeavoring only to obtain a just and adequate return for their labor and investment. In the light of later experience the semblance of competition that then existed between buyers was absurd. When we consider that bids were submitted, often containing fractional parts of a cent, and these sometimes as small as sixteenths, we realize how great an effort was put forth by the dealers to mystify and impress the growers with the intricacies of almond selling.

Disastrous competition among sections brought about a demand for a State organization. Some ineffectual attempts at state-wide organization had failed, when in 1910 Mr. J. P. Dargitz of Acampo undertook the work. His plan was to have local organizations in the several almond growing centers. Each association was to select a member to represent its interests in a State organization to be known as the California Almond Growers' Exchange. These representatives chose from their number five directors, from widely separated sections, to conduct the affairs of the exchange. They in turn employed a manager and other officers. A non-profit, co-operative corporation was formed. Uniform by-laws for local associations were recommended, and almond growing in California began to work out its own salvation.

Beginning without capital, without credit, with no selling agents, with a following composed of farmers lacking in familiarity with co-operative methods and impatient at delays, the task of finally cementing the growers into a businesslike organization strong enough to withstand the onslaught of the disconcerted commission dealers was a stupendous under-

taking. Mr. Dargitz was chosen manager. He at once began to systematize the business. A representative was sent into the Eastern markets. Selling agencies were established throughout the United States. New markets were exploited. Credit was established. The confidence of the growers was gradually won. The introduction of systematic methods lent stability to the industry. The market was steadied. The grower was guaranteed protection. Speculation in the almond was largely eliminated. The retail dealer was assured fair treatment and, still more important, the consumer was freed from the exactions of speculative prices.

Development still continues. The growth of the exchange has been rapid. There are now sixteen local associations. These are dotted over the State from Tehama on the north to Riverside County on the south. In these are over seven hundred members. The output of these associations is about three-fourths of all the almonds grown in California.

The exchange has developed the almond meat branch of the business to such an extent that, for its own protection, it became advisable to establish a nut-shelling plant. The erection of a building for this purpose was begun in May, 1914. The exchange now has a complete shelling plant at Nineteenth and C streets, Sacramento. It is a fireproof building and is located on the lines of the Northern Electric Railroad. This branch enables the exchange to meet an increasing demand for the shelled product. At times it also relieves congestion in the unshelled market.

The offices of the exchange are in the People's Savings Bank Building, in Sacramento. The exchange in making itself useful to its members has gone into many of the minute details of the business. It keeps the books of any association when so requested, attends to warehousing where no warehouse is owned by the local growers, purchases sacks for the output, furnishes almond poles, sheets, spraying machines, hullers, sulphur and other supplies. These it obtains at wholesale rates, making a substantial saving for its members. Through the medium of bulletins issued at intervals, it

keeps its members in touch with matters of interest pertaining to methods of growing and handling almonds. It advises as to the output here and abroad, and to the conditions affecting the marketing and sale of the product. It keeps in touch with the world's crop outlook and advises annually as to scale of prices to be maintained. It simplifies the obtaining of reliable nursery stock and advises as to methods of eradicating disease and destroying pests. It furnishes the services of a corps of trained salesmen. In this respect it places the grower on an equality with the broker. It is so potent a factor in the almond business that after fortifying itself with current crop statistics it has set the price of almonds in California for each of the last three years.

It assists in the negotiation of loans for its members and procures advances on almonds. It absorbs all of the selling burden, adjusts business complications, plans for the future, and is establishing the almond business of California on a lasting basis.

Its greatest hindrance and bar to higher

achievements is the self-independent grower. This grower is at once the victim of the broker, the stumbling block of his calling, and the chief competitor of the exchange. He is the man who, without expert assistance, with only a superficial knowledge of business conditions, with no definite data as to the output in competing countries, thinks himself competent to fix prices for a world-wide industry. He is one who, while anxious to be benefited by the co-operative work of his fellow growers, is unwilling to bear his part of the burden of organization. He is a negative quantity, continually attempting to nullify the constructive work of the exchange. He thinks his wisdom has a greater commercial value than the combined wisdom of all others in the business. He voluntarily and unnecessarily takes upon himself a distinct branch of the calling from which members of the exchange are free. It goes without saying that he does it indifferently, that his scattered efforts detract from his success as a producer. Personal loss results, and the entire almond industry suffers.

THERE are a thousand reasons why you should have "One Thousand Questions in California Agriculture Answered," by Edward J. Wickson, A. M., of the University of California.

This consists of 1000 of the most important questions on every subject that have perplexed the farmer during the last few years, and which have been submitted to the editor of the "Pacific Rural Press." In this book, the problem appears with its solution by Professor Wickson immediately following.

Price, \$1.50 postpaid. This book may be obtained from the Book Department of this publication and will be sent to any part of the world on receipt of price.



A One Thousand Dollar Load of Walnuts going to the Packing House

California Walnuts *and* Their Co-operative Marketing

By Carlyle Thorpe

Manager California Walnut Growers' Association

Editor's Note: Mr. Thorpe sketches the walnut industry of California, which reached its first great producing importance in Southern California but is now encompassing the State, for the English walnut has been thrifty and productive on suitable soils all through California valleys and foothills. Mr. Thorpe also describes the aims, purposes, and methods of the Walnut Growers' Association and their protective league, which are doing so much for the prosperity of growers of this nut.

THE TERM "English walnuts" is one of the most common misnomers. There are no table walnuts grown in England on a commercial scale and the term undoubtedly

became generally used because of the fact that the English people were among the first to appreciate the value of the table walnut, which is now conceded to be king of all nuts. The



A typical Harvesting scene in a California Walnut Grove

walnut was first grown commercially in Persia and is more correctly termed the Persian walnut. The ancient Greeks and Romans obtained the nut from Persia. Several hundred years ago walnut planting gained a considerable foothold in certain sections of France and Italy, but only within the last half century has planting in the United States gained any prominence.

About forty years ago the walnut was first introduced commercially into California. Plantings became quite general around Santa Barbara and soon afterwards from that district as far south as San Diego County, until at the present time, California, with the exception of France, is the largest producer of walnuts. While California is second in the production of actual tonnage of this excellent nut, the value of the output of walnuts in California is greater than that of any other district or country in the world. In other words, the California walnut is considered the finest produced and therefore commands a higher price per pound in the open market than the product of any other district, and this condition is due, principally, to three distinct causes:

First, the California soil and climate conditions are ideal for the production and maturing of a perfect nut.

Second, the farmers of California are an intelligent and progressive class of people. They are always on the lookout for an improvement in varieties or in cultural methods, and a trip through the walnut districts of the State will demonstrate conclusively that the orchards are cared for like gardens. No pains or expense are spared to secure the maximum production and the maximum quality of the fruit.

Third, the fact that the walnut growers of California have associated themselves together in co-operative marketing organizations with the result that they market their product at an absolutely minimum cost and their organization has become strong enough to properly develop the markets of the country on a business basis and by standardizing the quality of their product and then by assuring the dealer and consumer of the high quality of their nuts, have developed a demand for the product that is not equaled by any competitive lines. In this way producers insure satisfactory returns for their crop and, by constantly

increasing the demand and scope of distribution, are eliminating the possibility of over-production.

TEN ACRES MAY SUPPORT FAMILY

The average California walnut orchard contains about ten acres and this area of walnuts, properly located and cared for, can be made to support a family. The work is pleasant and the crop perhaps the most satisfactory to handle of any of the commercial crops of California. A crop failure is practically unknown and as a rule the production will not vary greatly from one year to another. In fact, the walnut is a steady producer and as near a sure thing as any agricultural undertaking. While the average orchard in California comprises but about ten acres, one man can easily take care of a forty or fifty acre place except during harvest time, and possibly for a few weeks during the year when irrigating.

Seventy-five to eighty per cent of the walnut growers in California are members of the walnut growers' associations. In each district where walnuts are grown to any considerable extent, the growers associate themselves to-

gether and form a local walnut association. These growers, through light assessments, erect a grading and packing house at a centrally located point, usually on a railroad siding, and after their nuts are harvested in the fall of the year, they are hauled to the packing house of their association and there graded, according to the standards established by the association, and packed and made ready for shipment.

Most of these local walnut growers' associations have in turn associated themselves with the California Walnut Growers' Association which, through its sales department, attends to the marketing of all of the walnuts produced by the various local walnut associations. At the present time there are nineteen of these local walnut associations whose output is handled exclusively by the California Walnut Growers' Association. This organization, which we will call the central association, is also a co-operative, non-profit body and simply attends to the marketing of the output of its members' product at actual cost to each. The sales thus made through the central association, average about two million dollars annually.



Eight-year-old Walnut Grove in California which produces 600 pounds of walnuts to the acre, but which will not be in full bearing for five years



Drying the walnuts after gathering

Sales are all made at prices which the growers themselves establish for the product, and as a result of the large volume handled through the central association the total selling cost to the grower is reduced to between $2\frac{1}{2}$ and 3 per cent of the selling price.

While the walnut industry at the present time is confined largely to Southern California, owing to the recent development of more hardy varieties the plantings are spreading until they are now scattered from one end of the State to the other, and some of the walnuts grown in Central and Northern California are now bringing the highest market prices. While the

walnut industry has shown considerable advancement in California within the past twenty years, it is still in its infancy. There are about 44,000 acres now planted to walnuts in the State. There is undoubtedly 100,000 acres of land now being devoted to grain or other seasonal crops which is well adapted to the culture of walnuts, and the beauty of the whole situation is, that when this hundred thousand acres is ultimately set out there will be a market and a satisfactory one for every pound of walnuts California can produce, because production in other parts of the country is not likely to reach large amount.

AN AVERAGE family can be supported by a ten-acre walnut grove in California. One man can take care of fifty acres except in irrigating or harvest time. Walnuts are sure sellers, profitable, and there is a co-operative organization that cares for the marketing of the product. These facts are worthy of consideration by the man who contemplates engaging in some branch of agricultural industry in this State. Detailed information concerning suitable locations for walnut growing can be obtained by writing our Service Department.

How California Fruits Are Served Fresh Around *the* World

By Charles H. Bentley

Sales Manager of the California Fruit Canners' Association

Editor's Note: The art of canning, quite modern in its wonderfully capacious machinery and methods, has been successfully invoked to give consumers in all parts of the world, and at any day of the year, California fruits and vegetables, with the beauty, aroma, and flavor characteristic of the product as it comes from the tree, vine, or plant. Canning is the sheet anchor of security to California's unique horticultural industries. Mr. Bentley is a leader in the industry and writes authoritatively.

WITH its northern boundary corresponding in latitude with Cape Cod, Massachusetts, its southern boundary corresponding with Charleston, South Carolina, with the range of latitude like that from Rome to Tripoli—and with elevations rising from the sea level to peaks of perpetual snow, California offers a wide range of soil and climate producing the widest range of fruits and vegetables used for canning.

To secure the products fresh and in their natural flavor has been the principle of success in this industry and as a natural result, each important fruit and vegetable district has its canneries—located so as to get the varieties of that particular district under most favorable conditions.

Many of these products are used throughout the year—whether fresh fruits or vegetables of the same varieties are in season or not. The housewife, the

caterer and the steward of the highest class, realize that the canned foods represent fresher, better flavored, more attractive, more convenient and more economical products than the so-called fresh fruits and vegetables of the markets which are necessarily several days old and exposed to contamination before they reach the consumer. Many of the products are shipped to tropical countries where it is unsafe to eat the fresh fruits and vegetables—many go to remote regions where the fresh articles cannot be had.

The containers vary in size from the small half pint for individual service up to the large gallon can for hotel use.

CALIFORNIA'S IMPORTANCE IN CANNING

California's output of canned fruits and vegetables now approximates annually 200,000,000 cans. It is one of the most important canning sections in all the wide world, distributing its products to all foreign countries of importance, save



The Del Monte Peach Orchard of the California Fruit Canners' Association

those which put up a prohibitive tariff wall against such products. Owing to the friendly tariff conditions in Great Britain the exports from California approximate 30,000,000 cans of California fruits and vegetables annually. They are shipped in smaller quantities to the countries of Europe and to Siberia, China, Japan, India. The Straits Settlement, Egypt, Australasia, and to the islands of the seven seas. With the reduction of import duties recently put into effect in our own country, it is hoped that reciprocal action may be taken in foreign countries, and if so a tremendous increase in the output of California canned foods will result. The quality of the products is admittedly superior, and California has received the highest awards at competitive exhibits of canned food products in all the capitals of the world.

The canner of fruits uses:

Apples	Grapes	Pears
Apricots	*Lemons	Plums
Blackberries	Loganberries	Prunes
Cherries	Nectarines	*Quinces
*Currants	Olives	Raspberries
Figs	*Oranges	Strawberries
Gooseberries	Peaches	

* Used for jellies and preserves.

The canner of vegetables uses:

Asparagus	Celery	Peppers (Chili)
Beans (Lima)	Corn	Pimientos
Beans (Baked)	Onions	Pumpkin
Beans (String)	Parsnips	Sauerkraut
Beets	Peas	Spinach
Cabbage	Potatoes	Tomatoes
Carrots	Potatoes (Sw't)	Turnips

The canning industry has been an important factor in the horticultural development of the State, for the canner experiments with new varieties on his own farms and orchards, demonstrating on a practical scale new and improved methods. He has often led the way and assisted financially and otherwise in fighting pests that threatened important varieties of fruits and vegetables. He gives a profitable and convenient market of great importance to the growers of many varieties. By canning the surplus in a season of plenty he extends the market for the producer. He gives em-

ployment under healthful, pleasant and remunerative conditions to thousands of employes during the summer and vacation months. He supplies a superior article of diet at low cost and great value throughout the year. He exploits new markets, advertises the State and opens up markets not only for the canned article but indirectly for the fresh and dried fruits. His market is largely in other states so that outside money is brought into the State to be spent largely for labor, for fruit and for other materials produced for the most part within the State.

CANAL IS BIG FACTOR

The opening of the Panama Canal naturally gives opportunity for better and more frequent service and more reasonable rates on the shipments of canned foods from California, not only to the Atlantic Seaboard of the United States, but to all foreign countries. Having the soil and climate for the production of its superior fruits, California is singularly blessed in being on the coast with great harbors already receiving the merchant marine of all the great countries of the world.

While growing a considerable part of their fruit and vegetables on their own orchards, by far the larger part is purchased under a term contract system with responsible growers. Frequently a grower owning a desirable piece of land can secure financial assistance to help him during the years before his orchard comes into bearing, and in further consideration the canner will oftentimes enter into a term contract for a period of years, guaranteeing to give the farmer somewhat better than the average market price for his fruits, to be delivered to the cannery in condition suitable for canning. The canner advises with the grower as to the varieties to be planted, methods of cultivation, time of harvesting, etc.

Not only does the canning industry directly employ over 25,000 people in the

State, but it keeps a great army of workers busy in various activities related to the growing, preservation and handling of fruits and vegetables and their finished products. Farmers, fruit growers, vineyardists, boxmakers, label lithographers and printers, can makers, glass makers and many more who are engaged in sugar refining, all owe a share of their prosperity to the canners.

SEASON LONG IN CALIFORNIA

The season of operation is much longer in California than in other states where the production of varieties is more restricted in number and in length of season. In the latter part of March the packing of asparagus begins, followed in almost unbroken succession with the packing of strawberries, peas, string beans, cherries, currants, blackberries, peaches, plums, pears, grapes, quinces, apples, with the closing of the season usually in late October on the tomatoes, which vegetable is packed in larger quantity than any other single variety, either of vegetable or fruit.

It is an amazing fact that with all the billion and more packages of canned fruits and vegetables that have been consumed from the pack of California there has never been one single authenticated case of illness or distress following the consumption of these products. From the

very nature of the case they are safer than so-called fresh fruits and vegetables which may be bought upon the market for in the hermetic sealing they are necessarily sterilized. They are used in Army and Navy hospitals, as well as by the troops. The extraordinary health standards of the soldiers in the Philippine Islands as well as of the laborers on the Panama Canal have been due in no small measure to the wholesomeness and variety of the food products packed in tin.

Fortunately the ignorant prejudice which formerly existed in the minds of many housewives, who felt that tinned foods were not altogether safe, has passed away, for the packing of foods virtually under State and National supervision and the rigid enforcement of food laws has removed all cause for such prejudice in the minds of intelligent consumers. Many of them will express admiration for certain fruits and vegetables which they secure in the highest class hotels, restaurants and clubs, and wonder why they cannot secure a similar product in the market at the time; never thinking that the much maligned tin can has made possible for them at any time and in any place a menu that would put to shame any feast of Lucullus, but all can be secured at a cost, which in these days of the high cost of living seems impossible and untrue.

THE standard authority on fruits in California is Edward J. Wickson's great work: "California Fruits, and How to Grow Them" which may be obtained from our Book Department at the publisher's price: \$3 per copy postpaid. Of this remarkable book the press has spoken in highest terms:

This is the standard work on California fruits, and in one or another of its editions is to be found in the homes of most progressive fruit growers in this State.—*San Francisco Chronicle*.

Methods *and* Achievements of the California Dried Fruit Industry

By Henry P. Dimond

Secretary of the Dried Fruit Association of California

Editor's Note: Mr. Dimond is the executive officer of the associated dried fruit trade of California. He presents a striking picture of the way in which fruit is grown and handled for a primary evaporated product—not a by-product—for our standard cured fruit is grown to be cured, as Mr. Dimond describes, and the consuming world will understand better how well it is served. The extent of the production and the breadth of its distribution is also discussed carefully and accurately and in a manner reflecting high credit upon Mr. Dimond as a writer.

WHEN we read an extraordinary book the natural desire is to know something of the author; a startling invention interests us in the inventor, and we are curious to know how he came to evolve it; and so I assume when the reader of this article learns that the California dried fruit product has in a single season amounted to five hundred million pounds, and that more than two and one-half billion pounds of fresh fruits were grown, harvested and handled to produce this dried product, there will be some curiosity to know, in a brief way, as to how this vast and ever-increasing tonnage gets from the tree in California to the mouths of millions of consumers in every portion of the civilized world.

PLANTING THE FRUIT TREES

To begin at the literal "root" of the matter, I am going to take the reader into partnership, his only investment therein

being the time required to finish this article and all the imagination he possesses. I insist on the imagination, for he must see and feel as well as read. We are in one of the many fruit districts of California, standing on and looking over say 80 acres of orchard land that we have bought and previously prepared for planting. The time is early January, which means the "rainy season" in California. What variety or varieties shall we plant; prunes, peaches, apricots, pears or apples? The answer to this all-important question does not depend on whim or fancy, but as the result of analyzing the soil, considering climatic conditions and by observation of neighboring orchards or those similarly situated. The trees are to be bought of a nurseryman, and here other most important questions arise. Suppose the answer to our first question is peaches or apricots, what "root" do we want? For all



Blossoming orchards which tell that Spring is at hand

trees are budded or grafted on various roots, and the trees we buy will be one or two years old from the graft or bud. We may require a myrobalan plum, an almond or a wild cherry or a peach root, and our final decision in the selection of this root must be governed by the character of the soil to a greater extent even than in our choice of the variety of fruit. Then we must fix upon the variety of peach or apricot, a Moorpark or Blenheim apricot; a Crawford, Lovell, Muir or other variety of peach. Upon these and other questions depend the number of trees to the acre, for we can plant cherry trees that are pruned upright at a considerably less distance apart than peaches, apricots or prunes. January and February are the best months to plant and in planting it is important that sufficiently large holes are dug. Should there be

found any layer of clay (called "hard pan") it must be broken through to give the young roots a chance. After planting, each tree is pruned back to insure branching that will enable it to carry its future burden of fruit; and also the trunk should be protected from the hot summer sun by whitewashing or by one or two shakes driven in the ground on the southerly side of the tree or by the use of manufactured tree-protectors.

Now follows several years of care in cultivating the soil, annual pruning to insure symmetrical growth, and proper irrigation, the latter depending on climatic conditions and locality, each year bringing more blossoms and more fruit until we can say our orchard is in bearing; not full bearing, but sufficient to attract the attention of the buying representatives of the commercial packer,

whom for years we have seen rushing by in motors or "dickering" with our neighbors each spring and early summer. We find we have, say, 80 tons of fresh peaches and apricots, which, estimated, will make 15 to 20 tons of the dried product. Along in April or May we have sold out the entire orchard at, say, 7c for the peaches and 12c for the "cots" (this is per pound for the fruit when dried), to be delivered at the purchaser's packing house.

THE DRYING PROCESSES

As it is now June, we buy or make a sufficient number of wood "drying trays" about 3x8 feet, upon which to cure the fruit, and arrange for labor to pick, cut, cure and sack. This labor, up to the present time, has been almost wholly local; the wives and children of small farmers, school teachers (during vacation) and

other young women and men who work regularly in the fruit districts through the summer season, the returns therefor being sufficient in some cases to provide for clothes and education during the balance of the year. The fresh fruit is gathered in "lug" boxes and hauled to the cutting shed which we have erected to protect the workers from the sun. There the fruit is cut in halves, the pits (apricot pits now have a commercial value and are bought of the grower by the packer) and defective fruit discarded and the halves laid on the trays with the "cup" or cut side up. Each tray carries about 60 pounds of fresh fruit and as soon as a sufficient number of trays are covered they are piled one on top of the other on a truck or car and run into the "sulphur house," where, in a small room, they



Picking apricots in a California orchard



Three varieties of fruit—figs, raisins, and peaches—in the trays. Note the character of the home and shrubbery. There are many such places throughout California

are subjected to the fumes of burning sulphur for from one to four hours, both to prevent oxidization of the raw surface, which would otherwise turn dark, and also because the sulphur fumes remaining for some time tend to keep away insects, which find an attractive depository for eggs in the raw surface before, in the drying process, it has had time to form a skin or "glaze" in the sun, for such eggs would develop worms in the dried product.

After "sulphuring," the trays are spread out side by side in a sunny field which we have left for this purpose, and as there is no rain and usually few cloudy days at this season, all fruits are dried in the open air. In the case of our particular fruit we leave it from eight to fourteen days on the trays and when thoroughly cured it is sacked and delivered to the

packer. Upon being "examined," passed and weighed in, we receive our money then and there, wending our way home happy or thoughtful, in accordance with the relation our selling price, of perhaps two months previous, bears to the present market quotations; and we return to cultivate, prune, sell and harvest varying crops under varying conditions as the years go by. We will have normally an increasing crop for some years, but there will also be wet and dry years, short crops and full, pests to fight and varying prices for our fruit. All, however, in a climate that knows no winter snows nor summer cyclones or tornadoes.

PACKING-HOUSE ACTIVITIES

Now let us see what became of the fruit we left at the packing house, and to this end let us increase the scope of our partnership and become packers as well as

growers. To do this we must have a city office as well as packing houses in the fruit districts. We must have a competent executive force. We must have financial arrangements with one or more banks, for as we were paid at the packing house door as growers, so must we now, as packers, not only be prepared to pay our growers, but in many cases we will have to make advances to them at the time we secure their crops. Our packing house supplies must be bought in advance. We must have reliable brokers and representatives in all of the principal cities of the United States and, if we are exporters, abroad also, to say nothing of our direct customers. We must watch the production of the world, we must estimate visible supply and future needs based upon past

demand, and keep in daily and at times hourly touch with crop and weather conditions in every fruit producing country in the world. We must issue trade letters to our customers for mutual benefit. The problems or risks of the grower are kindergarten compared to those which we are called upon to meet. Buying and selling of the future crop begins (unfortunately) before the fruit is hardly "set" on the trees, although the heavy deliveries are not made until September, October and November.

Having bought and sold a goodly portion of the product we are to handle, and having arranged our contracts and orders, filing the various specifications with our packing house superintendent, who from now on (next to the shipping head) is the



Peaches: A home drying field. The improvised wood track and car for handling the trays are worthy of note



Hand picking from the trays; after drying, defective fruit is removed from the trays and thrown aside

busiest man in our organization, the packing house opens up its season with the first deliveries of apricots. Box "shook" has been and is being made up into mountains of 50 and 25 pound boxes for domestic trade and $12\frac{1}{2}$ and 25 kilo boxes for export.

The label department has stacked, listed and arranged for rapid use the various trade and ornamental labels and cartons of our own brands, which have been bought by the millions; also those of our customers, for frequently the packer is compelled to carry and use large quantities of "private" labels belonging to customers.

Machinery has all been overhauled, bins cleaned and fumigated. And now the line of wagons appears at the doors and as fast as the fruit is passed and weighed it is dumped into a bucket elevator, which carries it to the grader. On the grader it passes over a long series of "screens" perforated with round holes, which operate with a shaking motion by means of eccentrics, so that while the fruit moves forward it is also retarded and vibrated

in such a way as to make the smaller separate pieces fall through the openings while the balance of the fruit passes on to the next screen, where the openings are slightly larger, and so on until the largest only is left.

The commercial grades are Standard, Choice, Extra Choice, Fancy and Extra Fancy, and while size is an important factor in grade it is not all; proper color and general character are also important factors.

On either side of the grader two or more girls move up, down and along a balcony and pick out defective pieces as they vibrate on the screens.

From the grader the fruit goes to the bins, from which the separate grades are taken for packing. Girls are employed to "hand pick" extra fancy grades, paste labels on boxes and face fruit. The latter operation consists in first placing the waxed paper and ornamental top label in the box, which is always "made up" with cover nailed on, and packed from the top down. If it is to be faced, individual pieces are put in even rows one at a time

and pressed into place; the second row slightly overlaps the first and the joints are broken as in shingling. It is purely a trade demand for display purposes, as when the box is opened from the top it presents a most attractive and symmetrical appearance.

SHIPPING ARRANGEMENTS

As soon as packed and loaded in the car, off it goes to destination, and we must put our documents through the bank. This is the bill of lading, weight certificate, invoice and draft. All save the former are prepared at our city office and await the bill of lading sent from our packing house. This is in the case of transcontinental shipments.

If the goods are going via the Panama

Canal to Atlantic ports or abroad, they are shipped to the docks at San Francisco and we must file an inspection application with the Dried Fruit Association of California, as our draft will not be paid at "two days' sight" unless the "quality certificate" accompanies our papers. The Association has official expert inspectors at the docks, who open and examine 3 per cent of all shipments in order to see that the goods conform with the grade and quality called for in the contracts of sale. This system has been in operation for some years and its success in the elevation of standards is evidenced by the ever-increasing tonnage examined under demand of buyers. In 1913 some 27,000 tons were inspected and over 3,100 certifi-



"Girls" facing fruit in a packing house; some are rather mature girls, but are nevertheless so called. Note the refined type of this class of labor, also the lighting arrangements as night shifts are employed during the rush season

cates issued. This year (1914), in spite of European conditions resulting in the loss of a great portion of our export business, the tonnage bids fair to exceed last year. If the inspector refuses to pass a shipment, the Association arbitrates the matter, fully and fairly protecting the buyer's interests. Of course an immense number of shipments and the greater portion of the tonnage still goes by rail, the total return to California annually amounting to over \$20,000,000, but as the packer's margins of profit are not great and he depends more on the immense tonnage handled than large profits, you are indeed fortunate, my partner, if for several successive years we can clean up with

our banks, pay our overhead and operative expenses, maintain our plants and each year find our balance on the right side of the ledger. From us the fruit goes to the thousands of jobbers and wholesalers, who, through their great organizations, distribute to the hundreds of thousands of retailers. Lastly these retailers sell and distribute by the pound, to the millions who consume on land and sea the world over, the peaches, prunes, apricots, pears, apples and raisins that nestled among the leaves of tree and vine in California, the harvesting, curing, packing and selling of which directly supports 250,000 people in that state to whom nature has been more than kind.

CALIFORNIA DRIED FRUIT CROPS, 1909-1913

Prunes			Raisins			Peaches		
Year	Tons	Exported	Year	Tons	Exported	Year	Tons	Exported
1909...	77,500	41,568	1909...	70,000	4,183	1909...	20,000	1,422
1910...	45,000	32,235	1910...	58,000	7,774	1910...	25,000	2,473
1911...	106,000	33,839	1911...	67,500	10,026	1911...	13,000	3,203
1912...	111,000	46,305	1912...	110,000	13,556	1912...	30,000	3,293
1913...	45,000	47,172	1913...	75,000	8,358	1913...	22,000	2,576
1914*..	51,000	.....	1914...	90,000	.....	1914...	32,000	....

Apricots			Evap'd Apples			Figs			N. Ital. Prunes		
Year	Tons	Exported	Year	Tons	Exported	Year	Tons	Exported	Year	Tons	Exported
1909...	14,500	6,822	1909...	3,000	.....	1909...	4,000	.....	1909...	22,500	.....
1910...	16,000	9,183	1910...	3,800	.....	1910...	3,775	.....	1910...	16,500	.....
1911...	11,000	6,097	1911...	4,000	.....	1911...	5,500	.....	1911...	11,425	.....
1912...	19,000	16,263	1912...	3,500	.....	1912...	5,000	.....	1912...	4,000	.....
1913...	9,000	10,685	1913...	1,800	.....	1913...	4,000	.....	1913...	14,000	.....
1914...	19,500	.....	1914...	4,000	.....	1914...	6,200	.....	1914...	.....	.....

*Estimated.

The California Fruit Growers' Exchange

By G. Harold Powell

General Manager California Fruit Growers' Exchange

Editor's Note: After demonstrating by several years' investigation by his branch of the United States Bureau of Plant Industry exactly what policies and methods would produce best results in picking, packing, and shipping citrus fruits, Mr. Powell was called to the general management of the California Fruit Growers' Exchange, our greatest co-operative association of California producers. By this organization growers of citrus fruits to the number of about 12,000 participate in the handling of their own fruit from the tree, through the packing house, and transportation to sales by their own agents 2000 or 3000 miles from the orchards. Mr. Powell presents a most striking reference to this significant accomplishment.

THE California orange and lemon crop equals 50,000 carloads, or about 20,000,000 boxes. There are between 10,000 and 12,000 growers engaged in the culture of the fruit. Four-fifths of the growers are organized into co-operative associations, more than 60 per cent of which are federated into the California Fruit Growers' Exchange.

The California Fruit Growers' Exchange is an organization which acts as a clearing house in providing the facilities through which 6,500 growers distribute and market their fruit.

There are three foundation stones in the exchange systems—the local associations of growers, the district exchanges, and the central exchange. The local associations, the district exchanges, and the central or California Fruit Growers' Exchange are organized and managed by the growers on a non-profit co-operative

basis, each of them operating at cost, and each distributing the entire net proceeds to the growers after operating expenses are deducted. During the past ten years the growers have sold \$140,000,000 worth of fruit through the exchange and have lost in uncollected bills and in other ways less than \$7,000.

THE LOCAL ASSOCIATIONS

The local association is formed generally by from 40 to 200 growers organizing, without capital stock, a non-profit corporation, which is handled by a manager, who is a salaried officer, through a board of directors, who serve gratis. If formed as a stock corporation, the association usually accumulates no surplus and pays no dividends except the usual rate of interest. Its function is to assemble the fruit of the members in the packing house and there grade, pack, pool and prepare it for market.

In some cases the grower picks his fruit, but in recent years most of the associations have assumed control of the picking, as well as the grading and packing, so as to standardize its physical handling and in this way insure uniformity, which is a big asset in the sale of any product.

A few years ago the annual decay of orange and lemons in transit often amounted to a million and a half dollars. The cause of the trouble was believed to be due to lack of icing, to sidetracking cars in the desert, and other abuses in the transportation service, but the Department of Agriculture found it was due to improper physical handling in preparing the fruit for shipment. As a result of the department's work and its recommendations, which have been generally adopted, the fruit is now usually picked through the associations by trained gangs of labor under competent foremen, the pickers are paid by the day rather than by the box, and care in handling is made a motive in every operation.

Formerly, when the buyer packed the fruit for the grower it cost him from 60 to 70 cents per box for oranges and \$1 or more per box for lemons. Through the co-operative buying of paper, nails, box shooks and other supplies the associations have cut the cost to an average of 33 cents per box for oranges and 60 cents per box for lemons, these figures including labor, packages and other materials, loading the fruit on cars and all expenses connected with the maintenance and support of the associations, exclusive of the picking. The fruit is packed under brands which are the property of the local association, thus preserving the individuality of the association and stimulating local pride, but the name of the central exchange and its advertised brands also appear on the package and on the fruit wrapper.

The fruit of similar grades from the different members of the association is

mingled and sold in common, the pool extending through a month, more or less. When a carload is ready for shipment it is marketed by the district exchange with the advice of the association, through the agents and facilities provided by the California Fruit Growers' Exchange, and the proceeds of the sales are divided among the members of the association pro rata on the number of pounds of each grade shipped in the pool.

THE DISTRICT EXCHANGES

The district exchanges, of which there are seventeen, are composed of the local associations, and, like the associations, are non-profit corporations, operating for them at actual cost, or are pecuniary stock corporations operating on co-operative principles. Each exchange acts as a medium between the association and the California Fruit Growers' Exchange. It orders cars for the associations and sees that they are placed for loading, keeps records of the cars shipped by its associations, informs itself through the California Fruit Growers' Exchange of every phase of the distributing and marketing business and places this information before the associations. It also receives from the agents the proceeds from the fruit and turns them over to the associations for pro rata payment to the growers, as above explained after deducting the actual cost of operation, which usually amounts to less than 1 cent per box.

THE CENTRAL EXCHANGE

The California Fruit Growers' Exchange is the central body formed by the seventeen district exchanges, with a directorate consisting of one representative from each of these exchanges, who serves without pay, and a general manager, who is a salaried officer. Like the associations and the district exchanges it also is a non-profit corporation, conducting its business at the actual cost of operation and declaring no dividends. It has no assets except a paid-in capital of

\$1,700, office fixtures and supplies, although it handles from \$16,000,000 to \$20,000,000 worth of fruit annually, or about 62 per cent of the citrus-fruit crop of California, and is able to secure the necessary credit, the bankers of California realizing that the co-operative movement is the foundation stone on which the \$200,000,000 invested in the citrus industry rests. In other words, this is a rural credit system of the soundest type, the federated moral security of 7,000 growers and a history of careful management being its only collateral.

The exchange has a legal department, which looks after any litigation that may arise; a traffic department, which looks after the routing of the cars and handles all shipping claims; an advertising department, through which an extensive advertising campaign is conducted to increase the demand for fruit; a mutual insurance department, which handles the insurance for the different packing houses; and departments which carry out the will of the local associations and district exchanges regarding the distribution, diversion, destination and sale of each car.

The exchange has also a supply company, which is a stock corporation with a capital stock of \$1,500,000, the stockholders being the local associations rather than the individual growers. This company was organized eight years ago because of the fact that the price of box shooks (box material ready for nailing together) was almost doubled in one year. After the company began the manufacture of boxes the box-making interests quickly reduced their prices to former levels. The company operates a manufacturing department and a material supply department. The former leases timber lands, operates mills and manufactures the box materials used in shipping the fruit, while the latter provides the supplies used in the packing houses and the orchards, these being furnished to the

members of the association at cost, including charge for depreciation and maintenance, plus 6 per cent on the assets and capital devoted to or invested in the department. The company has developed into a large institution, purchasing and manufacturing several million dollars' worth of supplies.

The central exchange furnishes facilities for the distribution and marketing of the fruit by the district exchanges, and to do this it places bonded agents in the principal markets of the United States and Canada and one in Europe. These men are exclusive salaried agents, except in territories where only a small quantity of fruit is sold, in which places the services of brokers are sometimes used. These agents work constantly to increase the trade, and in the sale of a car act directly under the order of the shipper.

When a buyer wants a carload of fruit he takes the matter up with the agent in his city or district; the agent wires the details to the central exchange; his exchange takes it up with the district exchange handling the brand of fruit desired; the district exchange takes it up with the association which owns such brand, ascertains the price it is willing to accept, and communicates the reply to the central exchange; and the latter wires it to the agent, who then negotiates with the buyer. Any further communication necessary until the sale is effected or rejected is carried on in the same way between the agent and the shipper.

When a sale is made the agent collects the money in the form of a check made payable to the California Fruit Growers' Exchange. This check is deposited in a national bank, and at the same time a check is made payable to the shipper of the fruit, covering the full amount. This, with a duplicate deposit slip, showing that the money was deposited, passes through the office of the California Fruit Growers' Exchange to the shipper, and at

the end of each month the central exchange levies an assessment against each district exchange for its approximate pro rata share of the cost, based on the number of boxes shipped. The final adjustment is made with each district exchange at the end of each year. In 1913-14 the total cost of operation, including advertising, represented approximately 2 per cent on the gross sales. It costs the American farmer not less than 7 to 20 per cent on gross sales to market the crop.

Under this system the growers and shippers, through their associations and district exchanges, regulate and control their shipments; that is, they determine the conditions under which their fruit shall be sold outside of the auction markets, ship when and in any amount they please, determine to what markets the fruit shall be consigned and where it shall be sold, and, outside of the auction markets, designate the price they are willing to accept. The central exchange believes it an unwise policy to lodge in a central organization the power to fix prices on fruit owned by the different associations or to control its diversion or destination. Centralization of such power might result in its arbitrary use, and under present conditions it would be questionable whether a central organization exercising such power or which has the right to exercise it is on a legal basis.

Through the agents the central exchange gathers daily information regarding the conditions of the market, secures detailed reports on the sale of every car of exchange fruit and on weather conditions, and sends this information in the form of daily bulletins to the district exchanges. These bulletins also include a catalogue of the details of exchange cars leaving California; all telegrams passing between the shipper and the agent regarding each car; several special reports from auction or private-sale markets; and at the end of each week and month summaries of the different business operations of the system. With this information at hand each shipper can intelligently decide the various marketing problems for himself and thereby avoid chaotic distribution and demoralized sales.

One of the most important functions of the exchange is to increase the consumption of oranges and lemons by advertising. The highest grade of fruit of each association is sold under a copyrighted brand, which is the property of the central exchange, and the second grade also is packed under an advertised brand, which supplements the brands of the local associations. By controlling the use of the advertised brands the exchange is in a position to make rules and regulations governing the grading and packing of the fruit sold under them.

IF ANY doubting Thomas still clings to the idea that the co-operative marketing of produce is not an established success let him consider this: During the past ten years, California fruit growers have sold \$140,000,000 worth of fruit through the California Fruit Growers' Exchange and have lost in unpaid bills, etc., less than \$7,000.

Co-operative Marketing of California Deciduous Fruits

By J. L. Nagle

General Manager of the California Fruit Exchange

Editor's Note: This organization is one of our oldest organizations for the purpose of co-operative marketing of fresh fruits not of the citrus family. Mr. Nagle outlines the way in which it originated and grew up; how it connects up with the growers, and what are its methods, purposes, and accomplishments. The article is attractive to the general reader by statement of unique facts and ideas to show what growers can readily do for themselves by organization. The importance of maintaining such co-operation is strongly presented by the writer.

CALIFORNIA is to the United States what France is to Europe, a producer of luxuries. Calculated on the basis of the selling price, an annual revenue of nearly three hundred millions of dollars is derived directly and indirectly from the fruit industry of California. This enormous income, upon which this State, in a great measure, is dependent, is distributed among the affiliated interests of the industry—the citrus industry, the deciduous, the canning and the drying, the products of all emanating from the soil.

It is a conceded and well established fact that the control of the marketing of the enormous citrus crop is in the hands of the producer and the marketing of the deciduous is fast assuming the same position. Prior to the organization of the California Fruit Exchange in 1901, the deciduous crop was marketed in a haphazard manner, competing firms operat-

ing without knowledge of marketing conditions, with the final results disastrous to the grower. Rebates and illegal profits held full sway and had no limit, and from these only a few benefited. There was little in those days to encourage the increase in production of deciduous fruits, and, as a last stand, some of the most prominent fruit growers in the State met in Fresno at a State convention and organized what now has grown to be the largest co-operative organization handling deciduous fruits in California. Enthusiasm and a determination to improve conditions and save the industry marked this important meeting. The members of the organization then formed returned to their homes and organized local associations of fruit growers, which associations formed the main exchange, which the first year of its history marketed 225 cars of fruit. Every conceivable instrument of

competition, political, financial and otherwise, was turned against it by the speculative competing interests but to no avail, and from that day to the present date, California Fruit Exchange has grown to a membership of over 1,500 growers operating in every district of the State from the Imperial Valley to Shasta County, marketing in excess of 2,500 cars annually, a representation of over three million dollars.

PROTECTING PRINCIPLES

The exchange, though purely co-operative, has a capital stock of \$100,000, divided into 1,000 shares of \$100 each. The by-laws provide that the stock can be sold to bona fide fruit growers only who affiliate with, and market their fruits through, the organization. No person, or persons, association or company, affiliated with the exchange can own more than ten shares, the idea being to obviate any possibility of control resting in the hands of a few, with a further view of protecting the principles and policy of the exchange by distributing the stock throughout the State and among as many members as is possible. This stock pays an annual interest of 10 per cent; 15 per cent of the annual profits is placed in a reserve fund and the balance of the profits is pro-rated among the members, irrespective of whether they are stockholders or not, on the basis of their gross sales.

As the exchange is supported by the commissions it receives for the handling of the fruit, which is 7% on the gross sales of all its shipments, and, as it has never cost 7% to operate, the difference between what it has cost and the 7% charge is refunded to the members at the end of the year. In this manner, the exchange is in a position to operate for its members at cost and at the same time protects its future by the accumulation of its reserve.

The exchange maintains a salaried selling agency in all of the principal markets

of the United States and Canada, whose duty it is to sell the exchange products at the highest possible price, to open up new markets and to furnish crop and market information to its California shippers from all other shipping points throughout the United States.

The exchange maintains a complete bureau of information, through which it imparts to its members daily the most minute information in detail that is of benefit to the industry and that tends in any way, shape or form to educate the grower.

The exchange also operates a traffic and claim department, whose manager has had years of experience in railroad service and whose duty it is to keep a record of all shipments, the time and departure of all cars, a record of the icing of cars and damage due to rough handling, wreckage, delays in transit, or, in fact, any other cause that has a tendency to affect the carrying quality of the fruit and thereby reduce its value. Claims were filed last year by the exchange in the amount of \$40,000 against the various railroads of the country and returned to the respective growers whose fruits were affected.

A most complete supply department is also operated by the exchange through which supplies of every nature can be furnished the members at wholesale rates, a small profit being retained over and above the purchase price for the support of the department.

FOR BETTER DISTRIBUTION

The object of the exchange in general is to improve marketing conditions by effecting better distribution through its selling agency, which is at all times under the control of the shipper; to reduce the cost of marketing; to improve the grade and pack of fruits, and its one aim and purpose is to place the marketing of the deciduous fruit crop under the control of the grower.

The great packing corporations, which control the most supplies of the country; the United Fruit Company, which controls the banana industry, and other like organizations of large capital, work exclusively for the holders of their stocks, but co-operative combinations of the producers themselves, organized with capital stock, operate wholly in the interests of the industry, with no profit to anyone except to the producers themselves through the economy of handling their own business in large volume. The co-operative system of handling and distributing the California deciduous fruit crop is the foundation stone on which the stability of the seventy-five million dollars estimated to be invested in the industry is built.

The exchange has been developed by the grower; it is managed by the grower in his own interests and the speculative dealer who operates to make money on the growers' product rather than in the interests of the grower, is being gradually eliminated from the California deciduous field, a condition toward which all other agricultural industries in America are striving to reach.

The difference between the exchange system of marketing and the commercial buyer or shipper is that the exchange is composed of growers representing the producing interests, who are interested in the fruit from its production until the time it is sold, while the commercial buyer has no interest in the fruit except after it is packed and then his interest is purely on a speculative basis and his existence in the business depends upon the profit that accrues from the actual handling of the fruit after it leaves the producer's hands.

CO-OPERATION DEFIES ARGUMENT

The policy and principles of the exchange, if properly fostered, alone insure its success. There is no argument against co-operation in the handling of the fruit

industry; no argument has ever been advanced why the control of the marketing of the deciduous industry should not be in the hands of the producer, who alone is interested and who alone should be benefited. An evident fact of the success of the exchange is demonstrated by its present position in the commercial field. Its business has increased annually and it is keeping pace with the increased production.

The working together of various individuals in the sale of their products, particularly of those engaged in horticultural and agricultural pursuits, has been in practical operation in various forms for a great many years. The earliest successful co-operative efforts of this character are reported from Europe. Denmark, Sweden and Norway, France, Ireland and other European countries have taken the lead in these matters, particularly in the preparation and marketing of their butter, eggs, poultry and like products, in co-operative stores and in co-operative rural banking. These old-world co-operative selling and business organizations have long since passed the formative period and the different lines of co-operation have become firmly established, until there is now no further question of their value to the producers or of their continuing to be a strong factor in the business life of the countries in which they exist.

In the United States, combination and organization of capital has, particularly during the last thirty years, become the order of the day, and, if the tillers of the soil are to hold their own against the other highly organized industries and business of all kinds, they must work together. That the people themselves understand the necessity for such action on their part in the State of California alone is shown by the organization and success of the California Fruit Growers' Exchange, a co-operative organization of six thousand growers who control the

marketing of the citrus crop of this State, and the organization of the California Fruit Exchange, which will unquestionably, within the next few years, be the leading factor in the marketing of the deciduous fruit crop.

The California Fruit Exchange has accomplished for its membership that which could be secured through no other source—a most efficient distribution of its products at the minimum cost of operation. Vast acreages are being planted to deciduous fruits and vines in California, which indicates that within the next few years its present annual tonnage of fifteen thousand cars will be at least doubled. It has been demonstrated in other states that there is only one successful way in which to market a similar output and that is through co-operation. The life of trade is co-operation and the stability of business is co-operation. These facts are daily demonstrated in the commercial as well as the agricultural field. Our inter-

ests must be protected and can be only by co-operation.

The growers of this State are fortunate in having already formed and at their service such an efficient organization as at present exists already prepared to handle and market ten times its present output, and, with increased business, assures its members of a still lower cost of marketing. The growers must be alive to their own interests at all times; they must absolutely control their own business and stand unitedly together in these great problems of distribution and marketing that will become more difficult to solve with the increased production. With a falling off of membership in the exchange, disaster to the industry would be invited, while, on the other hand, with a constantly increasing percentage of the crop to handle, it will be possible for the exchange to plan for successful future operation which will yield a maximum benefit to the industry and to the State.

OH, THE old farm days! How the fragrance of them still lingers in my heart! The Spring with its sugar-making and the general awakening about the farm, the returning birds, and the full, lucid trout-streams; the Summer with its wild berries, its haying, its cool, fragrant woods; the Fall with its nuts, its game, its apple-gathering, its holidays; the Winter with its school, its sport on ice and snow, its apple-bins in the cellar, its long nights by the fireside, its voice of fox-hounds on the mountains, its sound of flails in the barn—how much I still dream about these things!—*John Burroughs.*

How the California Fruit Distributors Distribute

By Charles E. Virden

General Manager of the California Fruit Distributors

Editor's Note: In a tersely written article Mr. Virden explains the purposes and methods of the California Fruit Distributors, recounting its inception, growth, and present extent as a factor in the distribution of the deciduous fruit crops of the State. Interesting facts and figures are embodied in the paper which is certain to prove valuable for reference to those who are interested in the marketing of California's extensive crops.

THE California Fruit Distributors came into existence in the year 1902, being incorporated at that time under the laws of California. The object of the corporation being to provide a central, neutral marketing and selling agency for the distribution of California deciduous fruit in its fresh or green state. No stock dividends are paid or profits undertaken. The organization does not buy a pound of fruit nor, in any sense, speculate.

Prior to the formation of this organization, with only a limited amount of fruit, the method of marketing was unsatisfactory alike to grower and shipper, so it was found necessary to form a central distributing organization with no other object in view than proper distribution; to serve and serve alike all of the members of the organization.

At the time this organization entered the field there was less than 100 markets receiving California deciduous fruit in carload lots, and the greater part of this was being handled by the receivers on consigned basis, or, in other words, being sold for the account of the shipper, which

means the grower and shipper were taking all the chances. Today, with a tonnage four times greater than twenty years ago, practically every pound of fruit sold by us is on a cash basis either at private sale or auction, and we are selling in more than 250 markets and are steadily engaged in creating and opening up additional markets.

The organization maintains selling agents in all markets; maintains general traveling salesmen, who are engaged in assisting dealers in establishing and creating a demand.

The organization through its traffic department has obtained better, more regular and dependable railroad service, more complete and effective icing service and obtained the lowering and adjusting of rates on a reasonable basis.

The benefits to the grower through the operation of this organization are direct and are invaluable, as the organization aims to perform the most efficient service possible in the handling of green fruit; working for standardization; improving the pack, quality, loading facilities; ob-

taining all other betterments at point of origin; obtaining fair and just transportation rates; obtaining the very widest distribution on a safe and sane basis; keeping every conceivable market fully supplied; not over-supplied, not under-supplied.

The organization is able to perform service for the dealers that no individual grower or shipper could possibly perform. We are in position at all times during the season to ship promptly any number of cars of straight varieties, assorted or otherwise. The dealers can obtain from us continuous supplies, thus enabling them to keep California deciduous fruit constantly before the consumer from the first to the last day of the season.

The California deciduous fruit season opens usually in the month of May with the shipment of cherries and closes in the early part of December with the shipment of Emperor grapes.

CALIFORNIA DECIDUOUS FRUIT SHIPMENTS— EXCLUSIVE OF APPLES

The growth of this branch of the fruit industry is best shown by comparing of

green fruit shipments for a series of years. Such comparisons likewise serve to indicate the relative shipping importance of the different fruits. The figures are in carloads, each car containing 13 tons, as follows:

	1895	1913	1914
Apricots	162	158	382
Cherries	180	231	166
Grapes	1010	6363	8688
Peaches	1289	2359	2144
Plums	465	1706	1906
Pears	1187	2496	2735
Totals	4,293	13,333	16,011

Apples have largely a different shipping season and are not included.

In addition to the shipment of fresh deciduous fruit a very large quantity of the same classes of fruits is produced in this State for the purpose of being dried, canned and made into wine; in all representing a gross commercial selling value of approximately:

Fresh	\$18,000,000.00
Cured or Dried	18,000,000.00
Canned	8,000,000.00
Wines	15,000,000.00
Total	\$59,000,000.00

“CALIFORNIA FRUITS” by Edward J. Wickson, A. M., is a standard of authority for all those who wish practical instruction as to how they may succeed in the industry of fruit producing in this State. This volume has received the highest commendation from press and public alike. Says the Auckland (N. Z.) *Weekly News*:

“California Fruits” is already accepted as the standard horticultural work in New Zealand, and though its author may not be aware of it, his book, besides having many admirers here, has had a marked effect on the development of our orcharding industry.

“California Fruits” may be ordered direct from the Book Department of this publication. Price \$3 per copy postage paid. It is a book of more than 500 pages, size 6x9, and finely illustrated.

Co-operation *in* Selling California Cured Fruits

By Henry M. Ellis

General Manager of the California Cured Fruit Exchange

Editor's Note: Mr. Ellis presents a pointed article describing the organization and operation of the California Cured Fruit Exchange. He tells how it came to be, what are its purposes and methods, and its achievements thus far and its possibilities. It connects the growers in a non-profit corporation for the transaction of their business, for improvement of product, etc., and has now twenty-six subsidiary associations of growers and a membership of over 1400 producers.

THE California Cured Fruit Exchange was organized because California growers of cured fruit realized that they, as well as other growers of California products, needed to be better informed about the markets. Better information and closer touch with the markets gives the grower knowledge as to what net price he ought to receive. By co-operation—working together—each learns something from the other, which means better care of their orchards, better methods of drying, all making for higher quality, and quality is what makes price.

The California Cured Fruit Exchange is a purely co-operative body, organized in 1912, under the laws of the State of California, as a non-profit corporation, with six local associations. It is a purely democratic body, owned and operated by the members themselves. In 1914 it had

grown to twenty-six associations, covering the State of California from north to south, and having over fourteen hundred members, all growers and driers of fruit. It handled for its members in 1912 about four million pounds of dried fruit—in 1913 about twelve million, and in 1914 about twenty million pounds. Its main usefulness is to dispose of, at the lowest margin of cost, the crops of cured fruit belonging to its members, which it does, charging them only actual cost, and making no profit whatever. In other words, it is a clearing house for the members of the various associations. It is the central link, connecting the numerous associations scattered over the State. Its by-laws are in harmony with those of its associations, and its members are elected from members of its associations. Any association which is not represented by a director in the Exchange is entitled to a

representative, who attends the meetings of the Board of Directors.

The members of the different associations appoint their own officers and directors, and these officers and directors appoint one of their members to represent them at the meetings of the Exchange, and from these representatives, the directors of the California Cured Fruit Exchange are elected, which brings the Exchange at all times under the direct management of the growers, who own, control and operate it.

The Exchange endeavors to obtain for its members, supplies, etc., at the lowest possible prices, and its every effort is being used to unite more strongly cured fruit people, not only for better prices, but for the results that come from closer contact with their neighbors and a better understanding of business conditions.

There is no state in the Union or country in the world where so large a variety of fruit is grown as in California, and it is about the only country where fruits can be dried by the heat of the sun alone; other countries have to depend on drying by artificial means, so it is natural, therefore, that a country possessing this advantage, over all others, should become the world's greatest producer, and its fruit find its way into every civilized country on the globe.

The Mission Fathers brought with them the fig and the grape, then came the prune, peach and apricot, and later, the Bartlett pear, and, while these command a market as fresh fruits over the United States and

have attained to some parts of Europe as well, it is only for a short portion of the year. To lengthen the time that the people might enjoy the fruit of this Golden State, the canner and drier came, and now the output of these preserved fruits runs into millions of dollars in money and thousands of carloads in weight.

Cured fruit, being the easiest handled and the cheapest, is now becoming a necessity to the consumer, as it contains the same healthful qualities that are found in the fresh fruit, for it is not picked for curing until it is in a state of ripeness, and it is only a part of the moisture which is taken away when it is cured.

With such favorable conditions existing in this State, it is only natural that many should try and get some of the benefits. This has led to hard competition among those engaged in marketing fruit, and has resulted in cutting of prices, and consequent loss to the producer, which has proved to them the necessity of forming an organization to handle their own fruit.

When the grower markets his fruit through the commercial packer, he has to pay the interest on the large amount of capital the packer is using in buying fruit, because the interest has to come out of the price at which it is sold. When the grower markets his own fruit, he requires only capital sufficient to cover the marketing expenses, because he does not have to buy his own fruit—in other words, selling his fruit at even no better prices than the packers pay, he obtains a better net, because his expenses are less.

CALIFORNIA is particularly fortunate over many other states and countries in that the heat of the sun alone is sufficient to dry fruit which is intended for sale in cured condition. The sun-cured fruits of California are celebrated for their excellence the world over.

What *the* Railroads Have Done for the Fruit and Vegetable Industries *of* California

By J. S. Leeds

Manager Santa Fe Refrigerator Dispatch Company

Editor's Note: Mr. Leeds presents a succinct sketch of the special arrangements, investments, and schedules which the overland railroads have undertaken and operated for the safe and quick movement of fruits and vegetables from California to the most remote parts of the country. He sketches such striking things as special rolling stock, fast schedules, pre-cooling plants, facilities for distribution, etc., with attractive descriptive statements and striking statistics.

CALIFORNIA is a favored spot. In the matter of climate, regularity of season, quality of soil, and the elements favorable for the production of fruit and vegetables such as are produced therein, it has advantages far above the average. On the other hand, it is the most remote of any portion of this country from the markets of consumption.

Of the commodities grown in California, a production and marketing of vast proportions has been developed. These commodities are moved over long distances and cover a very wide distribution, reaching all of the markets of the United States, Canada and Mexico. The principal feature to this end has been the development of successful transportation facilities almost wholly by railroad. Perhaps no more striking example of co-operation and team work between the carriers and producers is in existence than that which characterizes the transportation and marketing of these California products. This has been accomplished in the evolution of

the handling of this business covering all of the years of considerable production since the advent of the railroads into the business.

To successfully handle these products, they must be placed before the consumers in a sound and sanitary condition that renders them suitable in the highest degree for human food. To accomplish this the railroads have specialized by creating an organization making this branch of their service a feature separate and distinct, or a trade within itself. This organization is intended to and does look after the smallest detail which is necessary to render the service perfect and dependable. A very large equipment is provided, specially planned and constructed for the transportation of California products with special adaptation to the movement of the business over the long journeys which it must take to reach the consumer in the populous district of the country.

Approximately 22,000 refrigerator cars

are embraced within the equipment of the California railroads for this purpose, involving an expenditure of something more than \$30,000,000. No detail in the construction of this equipment, for the service which it is designed to perform, has been overlooked or neglected. It is strongly and substantially built to withstand the movement in heavy trains for long journeys through mountainous country; it is kept clean and in proper physical condition so that no shipper is called upon to load an unsuitable car. The cars are constructed to carry fruits and vegetables safely, under ventilation in winter season to protect against frost, and are provided with refrigeration devices for protection in the summer against heat and decay.

The construction of each new series of cars has taken up and used the latest and most approved devices for the service, so that each lot of cars constructed is intended to be better than those previously built. The railroads serving California have performed their service so well and successfully that the business has grown to such magnitude that the requirements of the traffic become a predominating influence in providing suitable cars and other equipment. This equipment is provided in sufficient volume to meet all of the fluctuations which may occur by reason of volume of crop to move, market conditions, or otherwise to promptly supply the demands of the business. To such an extent is this true that there has not been a shortage of cars extending over a period of even one day in connection with the handling of the crops of California fruits and vegetables for a period of more than seven years.

For refrigeration purposes, large icing facilities are provided, sufficient to meet the maximum demands during the busiest portion of the season in the handling of a large crop. Re-icing stations are provided on the line of the roads, approximately twenty to twenty-four hours apart.

For maintaining refrigeration on the journey to market, the cars are re-iced at all of these stations to the full capacity of the ice bunkers. In transit the ice in the bunkers of the cars seldom if ever sinks below the top of the load in the car, insuring a service as perfect as can be performed with present up-to-date facilities. These icing and re-icing facilities are maintained with a view to at all times having an ample supply of ice for the protection of the business in transit. They involve an expenditure of a large sum of money and their maintenance and operation is looked after in a manner to insure the most perfect service.

Pre-cooling plants have been constructed in California for the purpose of more promptly bringing the commodities under refrigeration. Pre-cooling as performed by the carriers is entirely different from ordinary cold storage and is adapted to quick transportation direct from the packing houses to market, and is growing in favor. The benefits accrue almost wholly, if not entirely, to the shippers. The plants were constructed as a result of conference with and at the request of a majority of the shippers. Loss and damage claims on account of improper or insufficient refrigeration in cars pre-cooled by the railroads, are practically wholly eliminated. These plants have been provided including the ice making attached thereto, at an expense of from half a million to eight hundred thousand dollars each. There are three of them within the State, two in southern California, and one in northern California. This pre-cooling is performed as a part of the refrigeration service of the carrier and for which no additional charge over and above the standard refrigeration rate is made.

Inspectors are maintained at every icing and re-icing station on the rails of the roads serving California, and each individual car of fruit or vegetables, whether

moving under ventilation or refrigeration, is inspected as it passes those inspection and icing stations, and a record is kept of the condition and of the service performed at that point. These records are at all times available for the information of the shippers. It is almost an impossibility for a car in transit from California to the eastern market to pass over the rails of any one of the roads serving California business without receiving proper attention. The inspection records are kept in permanent form so as to be available for reference at any future time.

TRAIN SERVICE

The trains moving these California products are organized under fixed fast schedules as to time. The operating departments of the various roads are under obligation to pay special attention to the business and to keep those trains moving, as nearly as is practicable, on schedule time. If necessary, in order to do so, tonnage is reduced even at a sacrifice of tonnage handled per train. Train sheets are kept covering the entire journey. Daily reports are made based on these sheets so that all who are charged with the supervision of this traffic are in constant touch with it and any lapses which may take place are promptly corrected. "Consists" of trains carrying fruits and vegetables are telegraphed from points of origin and promptly recorded at eastern termini. Passing reports are wired from various stations along the line. In this manner, a shipper may be advised within reasonable limit of the proximity of his car at any point along the journey and that without delay. The regularity in the movement of these trains is such that the California shipper or producer may know with reasonable certainty when a car leaves his station in California, when it will be at its destination as billed.

The privilege of diverting from one destination to another is extended to ship-

pers upon a very liberal scale, and such diversions are generally made without any additional expense over and above the rate which prevails from the point of origin to the final diverted destination, thus enabling the shippers of California to reach any market in the United States or Canada, which is large enough to consume a carload of California products. This is a protection to the shipper against the arrival of a car at the original billed destination covering a journey of several days, upon an overstocked or low market. It is equivalent to giving the shipper a choice of markets covering all of the time of the journey of his car in transit. The only expense to the shipper over and above the original rate for transportation and refrigeration is, in the case of refrigerated stuff, the expense of refrigeration during the periods of detention at intermediate or billed destination points, for which he is responsible.

In the accomplishment of all of this service, the telegraph service of the carriers is made use of without restriction, and to an extent necessary to accomplish the prompt performance of everything undertaken to expedite the movement and make proper disposition of the commodities without loss to the shipper. In the transportation of this large business, no detail is neglected which will contribute to the successful performance of the service. There is no parallel in this country to the perfection of service given by the California railroads in the fostering and upbuilding of the fruit and vegetable industry. To such an extent is this true that anyone engaging in production can proceed with his enterprise with entire assurance that the transportation feature of this transaction need give him no concern. He knows that he may have the advantage of all of the markets this country affords, as far as perfection of service can render them available.

Protecting California Producers

By Arthur Dunn

Secretary and Manager Farmers' Protective League

Editor's Note: Several initiative amendments affecting the agricultural interests of the State cropped out during 1914 and to meet them and, as the election proved, to defeat them a new farmers' organization was undertaken and gained wide support and large membership. This organization is to be maintained to advance legislation which is necessary for the support of the industry and to oppose that which is directed against it. Mr. Dunn, who led the organized effort of 1914, discusses the past and future of the organization.

THE Farmers' Protective League of California is the outgrowth of a campaign committee appointed by the State fruit growers' convention of June, 1914, to oppose proposed legislation that was deemed inimical to the agricultural interests of California.

There was such a widespread demand throughout the State for an organization that would voice the views of farmers generally that it was decided to organize on a permanent basis the Farmers' Protective League of California, each county being organized as a separate unit, having its own officers and directors and sending representatives to the parent organization, which maintains headquarters at Sacramento, the State capital.

The purposes of the Farmers' Protective League are strikingly patriotic and progressive: First, to improve in general the conditions under which agriculture is conducted. Second, to give expression to the spirit of progress which animates every farmer in this great State.

Agriculturists long have felt the need of an organization that will deal frankly with questions, which, essentially economic, have a political aspect. The league is absolutely non-partisan. Its membership is concerned only in those problems which affect the material wel-

fare of the whole people of California. The league membership is kept advised of what is being done by its own monthly publication.

The officers and directors of the league serve without compensation. The membership is not required to pay fees or dues, but may contribute any sum as each individual feels he or she can afford. This policy has made for a very large membership which ultimately will include virtually every farmer in California. Such a body must exercise an influence for good. Considering all phases of agricultural problems—state farm credits, state and local taxation, the consolidation of the many branches administering agricultural affairs in the state government, economy and efficiency in administration of public affairs—the Farmers' Protective League has a permanent programme of progress prepared.

The officers and directors, who sacrifice their time to accomplish the upbuilding of the league, are actuated by the highest motives in defining the policy of the organization, seeking no personal reward save that which comes to each who does well the service exacted of him. They have launched a policy which can only result in the success of the league and in the permanent advance of agriculture in California.

Factors in California's Canning Industry

By Dr. A. W. Bitting

Food Technologist and Expert Chemist

Editor's Note: Doctor A. W. Bitting is one of America's foremost food technologists. Together with Mrs. Bitting, who is an expert microscopist, he is in charge of the National Canning's exhibit at the Panama-Pacific exposition. Doctor Bitting excels as a chemist and has applied his extensive learning to the preservation of fruit and vegetables and the resultant chemical changes that ensue. His article briefly but clearly tells what California is doing in canning.

SUCCESSFUL canning of fruits or vegetables depends in a large measure upon the raw material, in the capability which it possesses of retaining character and flavor after sterilization. While this factor should appeal to packers as self-evident, it is frequently ignored, resulting in injury to the immediate product and suspicion cast upon production which may be good. It is easily possible to have a fruit with good flavor and beautiful appearance when fresh, and this same fruit be a complete failure when canned, through loss of flavor, breaking down of structure, or both. Scientific food preservation seeks, first of all, to secure varieties of fruit and vegetables which have distinctively desirable characteristics and then to treat them in such a manner that these qualities will be preserved with the minimum of change, or if change should take place, that it be in the nature of an improvement.

California ranks first as a canning state, not simply because fruits are grown in

abundance, but rather because their character is such that they lose little through preservation. Volume of fruit alone cannot create a demand; it can only satisfy the want after it has been stimulated by quality. The diverse climatic conditions make possible not only the growth of a greater variety of fruits than is found in any other state, but also provides some locality in which each variety attains a very high degree of perfection. The skilled horticulturist and pomologist have lent their aid by breeding and selecting types which are particularly suited to canning. The effort has been to produce fruits as well suited to canning as other sections have for consumption in the fresh state. In other words, some varieties of California fruits have been developed as a specialty for the canner and he is not made dependent upon the surplus of crops grown primarily for other purposes. Herein is the point of advantage which the local canner has over his competitors.

While vegetable canning is not of the

same importance as fruit canning, the volume is rapidly increasing. California is pre-eminently the home of asparagus. More than 90 per cent of the entire pack in the United States is grown on the delta lands of the Sacramento and San Joaquin rivers. The conditions of soil and climate are such that the stalks are in perfect condition for canning. The Blue Lakes region has acquired a reputation for a superior quality of string bean and the indications are that the acreage will increase rapidly. Santa Ana, while well known as a nut producing center, is now the garden spot for the growing of chilis and pimientos for canning. With the exception of corn, every vegetable is grown and packed in the State.

A second essential in successful canning is that the fruits and vegetables be gotten into the cans when at the right period of development and soon after being harvested. Vegetables like asparagus, beans and peas change with remarkable rapidity in the young and tender state. The vascular bundles thicken and toughen in asparagus and beans. A stalk of asparagus which is perfectly tender when first cut may have considerable fibre present in twenty-four hours; beans which might be called stringless when picked may have a considerable proportion of strings present after standing in boxes for a day. In peas there is a decrease in sugar, an increase in starch and a toughening of the coat. The change in flavor is even more marked than the structure. Asparagus becomes bitter, and beans and peas lose the distinctive flavor associated with the fresh garden product. The California canner has learned these facts from practical experience. The very remarkable results achieved by Mr. Hickmott with asparagus are due to taking the factory to the ranch instead of carrying the product for a long distance to the cannery. It may truthfully be said that the difference

in time, three to four hours from the field to the can instead of a day or more, has made the canned article a matter of preference with connoisseurs, even during the picking season. At the present time every packer of high-grade asparagus has moved the factory to the growing grounds, even at a sacrifice of equipment already in place or of more advantageous labor conditions. Cannerymen of peas and beans are now following the same practice which has proven so profitable with asparagus.

The quality of fruit in a can bears a very close relation to the condition when picked. An apricot picked slightly green and permitted to stand in a box until soft and apparently ripe will retain some of the bitter and astringent quality. It does not develop that peculiar and delightful aroma and flavor that it does when ripened upon the tree.

If canned when green there is a retention of the green taste, regardless of the syrup used. If canned when fully ripe, there is a preservation of the luscious qualities. The same observation holds for other fruits. The actual period when fruit may be packed in perfect condition is therefore very short. The advantage which the California packer has is that the climatic conditions are such that the ripening period is prolonged and that varieties have been developed which follow each other in close succession.

THE NATURAL FLAVOR

The methods of canning generally followed are those which experience has demonstrated to be safe. Experiments conducted during the past two years have shown that it is possible to preserve some fruits at a much lower temperature than has been used and that some change of a very desirable character may go on within the can. It is not known to what action these changes are due, but it is seemingly enzymic, as the flavor has the

quality as of the perfectly ripened fruit. The changes are comparable to the production of the bouquet in fine wines and liquors. It has long been assumed that canned fruit must deteriorate on standing, and while this is undoubtedly true for some products it is the belief that the opposite condition may be brought about by the proper treatment.

California has added her quota to the new products offered in cans. Three recent additions being the ripe olive, the chili and tuna. All of these products have been received in a most favorable man-

ner, the demand being in excess of the supply, for the first and last.

Probably one of the most important things which the consumer is learning about canning is that better material is used than is generally found in the fresh market. Instead of canning the left-over or surplus stock, it is the choice material that is demanded. The removal of "no admittance" signs from over the doors and the invitation to the public to see what goes on within the factory is doing much toward producing a proper conception of the character of canned foods.

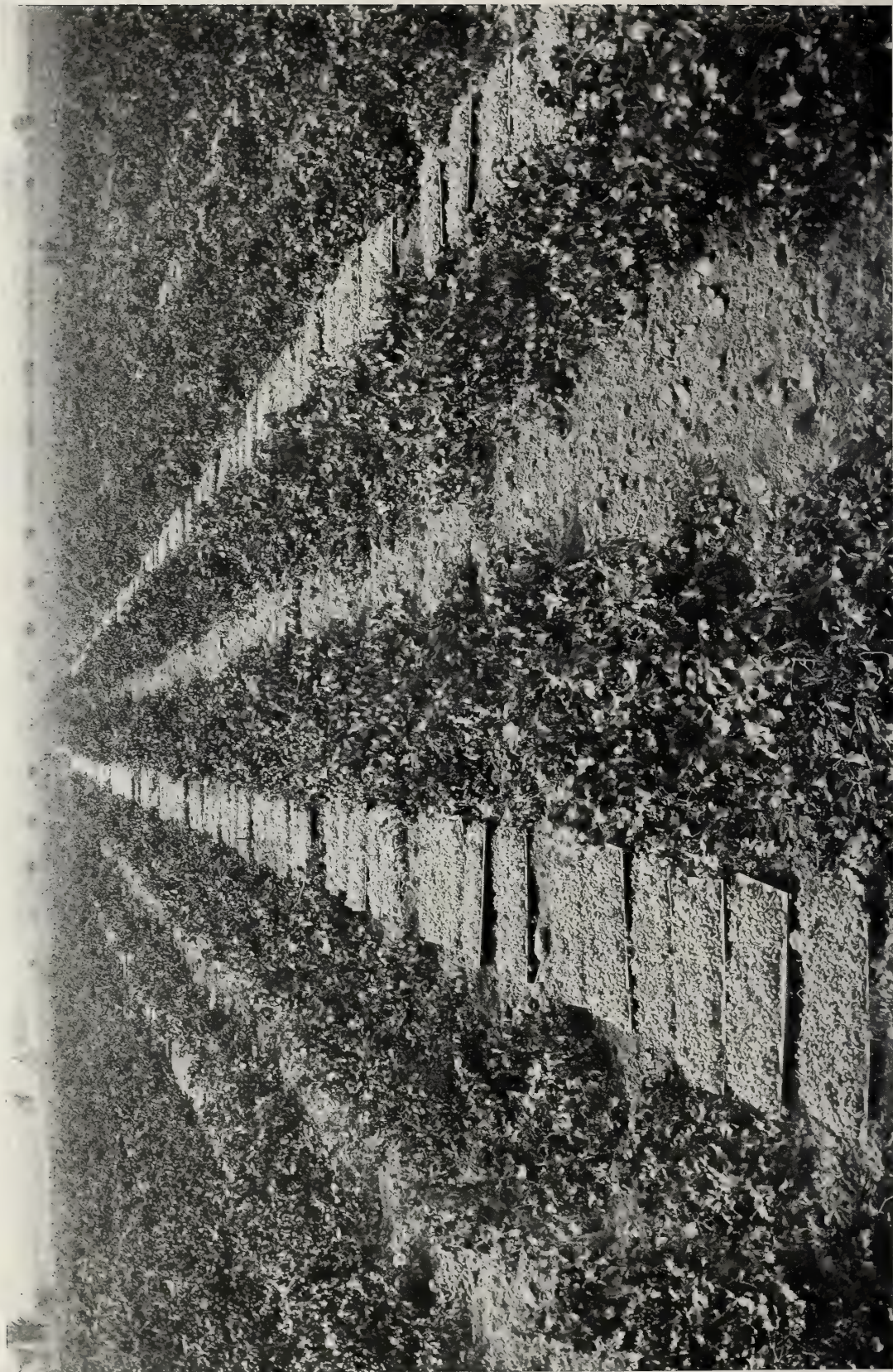
THOSE who would make money from the soil and do it in a pleasurable manner, should try vegetable growing in California. Secure a copy of Professor E. J. Wickson's volume, "California Vegetables," and you will avoid many costly mistakes. It may be had from our Book Department at the price of \$2 postpaid. Hear what the press says of it:

Of great value to all who are interested in the cultivation of vegetables either for market or home use.—*Watsonville Pajaronian*.

It should be in the hands of every intelligent and progressive farmer who believes in mixed farming.—*Riverside Press*.

A volume that will prove of much value, not only to new-comers but to old settlers.—*San Jose Herald*.

No one intending to make vegetable-growing in this State a business should be without this valuable book.—*Visalia Times*.



Sun-Drying Raisin Grapes in a California Vineyard

What California Is Doing for the World in Raisins

By James Madison

*Vice President and Manager California
Associated Raisin Company*



Headquarters of the California Associated Raisin
Company, Fresno, Cal.

Editor's Note: Mr. Madison gives an interesting account of California raisin production. This great industry, which has been the chief developing force in the heart of the San Joaquin Valley and which turned back the tide of European raisins from the United States, is discussed by the man who has done so much to bring the industry to its present phase of prosperity through effective organizations of the producers themselves. Important figures are given of the extent of raisin growing, the chief producing districts, and the opportunities which exist for the extension of California's interest in the world's raisin trade.

CALIFORNIA is a state of superlatives. Whatever it earnestly attempts, it leads in. One of these superlatives is California raisins. The raisin is one of the best and oldest of all known fruits. It is mentioned in the Bible, first in the book of Numbers, and later in the book of Samuel, thirty-five hundred years before the birth of Christ, and one has only to read the references to it to learn that in these early days of human history it was regarded as wholesome, nourishing and strengthening.

During all the intervening centuries it has retained its hold upon humanity as an article of diet. In the darkness of the Middle Ages

from the fourteenth to the sixteenth centuries, it was regarded as an article of high commercial importance, and ranked as one of the leading articles of business exchange.

We have no positive knowledge of the date when the raisin first made its way into Western Europe, but we do know that thousands of years ago it was grown extensively in the countries of the Orient, and was carried by Oriental invaders into Western Europe, finally resting in Spain, which afterward became the greatest raisin producing country in the world.

THE RAISIN GRAPE COMES TO CALIFORNIA

From Europe the vine found its way to California, where it made its first appearance



Where the vines cover the land as far as the eye can reach

in 1851, having been introduced by Colonel Agostin Haraszthy of San Diego, from some muscatel vines and seeds of Malaga raisins. In March of the following year he imported the Muscat of Alexandria from Malaga, Spain. Ten years later during a visit to that country in September, 1861, he selected cuttings of the Gordo Blanco, which afterwards were grown in his vineyards in San Diego. Consequently he was the first man to introduce the raisin vine in California. Another importation of the Muscat of Alexandria was made and planted in 1855 near San Jose by Mr. A. Delmas. Mr. G. G. Briggs of Davisville also imported Muscatel grapes from Spain.

The first public exhibition of raisins made from Muscat of Alexandria grapes was by Doctor J. Strenzel of Alhambra Valley, Contra Costa County, at the California State Fair of 1863. He also showed dried grapes of other varieties to demonstrate the character of a true raisin.

In 1873 Judge J. W. North, founder of the Riverside colony, first planted Muscat of Alexandria grape vines, but it was three years later before the grape growing in that district became general.

In El Cajon Valley Mr. R. G. Clark planted raisin vines in 1873, but the most of the vine-

yards in that excellent district were planted in 1884 to 1886. In 1875 McPherson Brothers, at one time the largest growers and packers in the State, planted raisin grapes in Orange County.

Soon after San Bernardino and Los Angeles counties went into the raisin vineyard business, but the ravages of the Anaheim disease during the years 1884 to 1889 destroyed thousands of acres, and led almost to the extinction of the raisin vineyards in the district, which is now so famous for its citrus fruit.

THE BEGINNING IN FRESNO

In 1872 Mr. Eisen, while experimenting with vines, planted some raisin grapes in Fresno County, and in the third year he sold the raisins readily to a number of San Francisco people. Later a number of gentlemen in that city bought land and planted some raisins. So in 1880 the number of vineyards in Fresno County had reached quite respectable proportions.

A Fresno lady, Miss Hatch, has been credited with being the first individual who dried and packed raisins in the United States. The above records show that there is some doubt as to whether that really was the case, but there is no question that she was the pioneer in that line in Fresno County.

In 1876 Mr. W. S. Chapman imported some

of the best obtainable Muscat vines from Spain for the Central California colony in Fresno County, but they were not found to be any different from those already growing here. The name of the party who first introduced raisins in California has not, and probably never will be, satisfactorily proven, but what is of chief interest to us is the fact that California has taken rank as the greatest raisin producing country in the world.

The first considerable raisin vineyards of the State were those of Mr. G. G. Briggs at Davisville, Yolo County, and Mr. R. B. Blowers of Woodland, Yolo County, the former having planted principally Muscats, and the latter Muscatel Gordo Blanco. After years of experimenting, several of the counties in the State ceased to produce raisins, while others are doing so on a limited scale.

The crop of 1913 by counties is estimated as follows:

	<i>Pounds</i>
Fresno County.....	94,000,000
Tulare County.....	25,000,000
Kings County.....	20,000,000
Sutter County.....	4,000,000
San Bernardino County.....	3,600,000
San Diego County.....	3,200,000
Madera County.....	2,400,000
Yolo County.....	2,000,000
Kern County.....	1,100,000

It is not definitely known when raisins were first shipped in large commercial quantities, but in 1875 New York recorded that up to November 1, 6000 twenty-two-pound boxes of California raisins had been received. In 1888 Fresno County appears to have shipped its first considerable quantity. In 1887 market reports stated that "Fresno raisins of excellent quality are now on the market, especially from the Forsyth and Butler vineyards." That was in the days antecedent to the coming of the packers. The farmers at that time did their own packing.

The varieties of raisin grapes are few in number. The White Muscat of Alexandria, and the Muscatel Gordo Blanco fill first places; Malagas and Faherzagos are used to a small extent. The seedless varieties are the Sultana, which is grown extensively in Smyrna, in Asia Minor, and which was first brought by Colonel Haraszthy to California in 1861, and the Thompson Seedless, so named by the Sutter County Horticultural Society after Mr. W. Thompson, who procured the cuttings from Elwanger & Barry of Rochester, N. Y. For years a halo of mystery as to its origin hung over this splendid vine, but the pomological experts in Washington claim it to be the Sultanina Blanco, originally a na-



Irrigating young grape vines at nurseries in Fresno County

tive of China, and known to have flourished there 2000 years ago. Mr. Blowers of Yolo County also introduced a pink variety of the same grape on his ranch in Fresno County, which was also known as the Sultanina Rosea.

In the earlier period of raisin history in California, San Bernardino, which then included what is now Riverside County, produced the largest quantity of raisins. In the first six years the progress of raisin production was slow, but later the growth of the industry was phenomenal. In 1879 the crop first exceeded 1,000,000 pounds. In 1885 it had grown to 9,000,000 pounds and in 1886 to 14,000,000 pounds, and it continued to increase yearly until it has now reached the enormous total of 180,000,000 pounds.

FOREIGN TRADE IN RAISINS

It is interesting to note how the importations of raisins have decreased with the increase of our home crop. In 1873 we produced about 100,000,000 pounds, and imported over 35,000,000 pounds. In 1884 we imported nearly 54,000,000 pounds. Fifteen years later our importation had dropped down to a little over 6,000,000 pounds. Our export is correspondingly increased. In 1898 we exported 3,000,000 pounds, and in 1910 over 8,000,000 pounds.

Canada is our best foreign customer for raisins; New Zealand comes next, followed by Mexico and Japan.

Great Britain is the most extensive consumer of raisins in the world, but buys very few from us because of the close proximity of Spain, and the lower prices at which they can buy the Spanish product.

GROWERS' EFFORTS AT MARKETING

Many plans have from time to time been tried to market the raisin product at a living price to the producer. One reasonably successful plan was under the leadership of Mr. M. Theo. Kearney about 1895. Shortly after the falling to pieces of his organization, raisins were known to be sold for as low as $\frac{3}{4}$ cent per pound, cheaper than potatoes, and at that time a great many acres of vines were pulled up and the ground planted to other uses.

Another attempt was made in 1905 to organize the growers, but owing to a prejudice among them against co-operation, only 38,000 acres signed up, and therefore in May, 1906, it was again dissolved.

In the spring of 1913 the California Associated Raisin Company was formed more on commercial lines. The raisin growers have paid into the corporation \$1,000,000 for the purpose of financing and handling their crops, and the Associated Raisin Company has contracts with more than 6000 growers, more than 90 per cent of the output from the State. Absolute necessity compelled the growers for their own protection to form this association, as every raisin grower who had no other means would have gone bankrupt or gone out of the raisin business if something had not been done. A product that under the management of the Associated Raisin Company will bring to the State from \$8,000,000 to \$10,000,000 annually should be taken care of, whereas formerly it would only bring half of that sum, and all of this can be done without making raisins cost the consumer one penny more, and give the growers a price that will pay interest on a reasonable valuation of his vineyard and compensate him for his risk and labor.

PRODUCTION OF SEEDED RAISINS

A great change in the raisin industry took place in the late '90's. In 1896 the seeding of raisins was taken up in a commercial way. It has been known for twenty years prior to that time that the seed could be removed from the raisin by machinery, but it had never been put into any practical use. At that time Colonel Forsyth of Fresno began making commercial use of machinery to remove the seed from raisins, and some 600 or 700 tons were placed on the market. That has gradually increased annually, until in the year 1912 over 40,000 tons were sold in that condition, and from the last season's crop it will practically be about the same amount.

The raisin industry in California has immense possibilities, especially for the counties suitable for that business.

Great Britain and modern Europe use about five pounds per capita. The United States,

with perhaps 100,000,000 people, consumes less than one and a half pounds per capita. With a consumption brought up in this country to equal Great Britain you can easily see the possibility for the California vineyardist and the acreage that could be planted to vines.

FOOD VALUE OF THE RAISIN

The value of the raisin as an article of diet can not be too strongly impressed upon the people. There is no other food which contains the same concentrated strength and nourishment.

One high authority says, "The food value of the raisin is greater than that of any other fruit in popular consumption." Its superior nutritive quality is due to the large amount of sugar, gluten, mineral salts, and fruit acids, together with a lesser quantity of water than usual in fruits. Grape sugar is the chief nutritive constituent. The particular advantage which grape sugar possesses over all other types of sugar is the ease of its assimilation.

Probably one of the most important bulletins ever issued by the Department of Agriculture, Bulletin 142, gives the comparative food value of raisins against other foods, as follows:

One pounds of raisins represents a food value equal to each of the following:

- Six pounds of apples;
- Five pounds of bananas;
- Four and three-quarters pounds of potatoes;
- One pound of bread;
- Four pounds of milk;
- Four and three-quarters pounds of fish (edible portion);
- Two pounds of eggs;
- One and one-third pounds of beef.

An important medicinal value of raisins is their laxative effect.

An eminent medical authority of the Royal College of Surgeons of London, Doctor Josiah Oldfield, states: "I put raisins as the first of all fruits that I know; they are far superior to grapes, because the sugar has thoroughly matured and ripened, and transformed ready for digestion."

Another eminent English authority, Sir Wil-

liam Gull, in giving his evidence before a royal commission of the House of Lords, stated: "After a hard day's work I get more strength from eating a few raisins than I would from drinking a glass of wine."

Mr. Elbert Hubbard has written: "The extreme prices of meat and bread stuffs are giving California raisins their innings. The raisin is the finest fruit that I know of. It can not be adulterated. Your children will find raisins a natural, heaven-prepared food."

An eminent American physician, Doctor George Still, has this to say: "Raisins never caused appendicitis, but the lack of them may."

RAISINS IN STATE DEVELOPMENT

It is a pleasure to know the interest that the whole State—yes, the whole United States—took in Raisin Day. That is the beginning of an advertising campaign that the California Associated Raisin Company contemplates beginning for the purpose of increasing consumption of this, our beautiful product, so that we may find a more ready market for all we now produce.

From \$8,000,000 to \$10,000,000 per annum is brought into the State of California, real new money—money brought out of the earth by the raisin grower. That is the class of money that increases wealth. Most of the business transactions are matters of exchange of one to the other and do not particularly increase the wealth of a community, but money like this raisin money is divided up and eventually every person within the State gets an indirect benefit from it. In the packing season we employ over 4000 people and our pay roll is over \$50,000 per week.

The vineyards of California have been from an advertising standpoint, one of the strongest and most inducing and convincing evidences that have ever been sent out to the world of our beautiful climate and of the productiveness of the soil in the State of California, and that is an asset of incalculable value.

The acreage planted in raisin grapes in California in 1914 is estimated at 120,000 acres. The annual crop ranges from 180,000,000 to 200,000,000 pounds.

The Grape *in* California

By E. M. Sheehan

Member and Secretary California State Board of Viticultural Commissioners

Editor's Note: The importance of the grape in California is graphically shown in Mr. Sheehan's article, which is largely statistical and, by striking facts and figures, indicates the extent to which the industries dependent upon the fruit of the vine have been carried. As secretary of the State commission which must care for the problems of the grape men, Mr. Sheehan is in a position to speak authoritatively upon the subject.

EXCELLING in quality as well as quantity of product, California is today supplying the United States with the bulk of raisins, wine, and table grapes consumed, as well as shipping great quantities of vineyard products to other parts of the world. It is therefore not surprising that it has gained the reputation of being the mart of the North American continent for this variety of output.

It may not be amiss to commence this paper with the somewhat startling statement that the viticultural industry in California represents an investment of \$150,000,000.

More than half the entire acreage of vineyards in the State is planted to wine grapes. The best estimates place the total area at 170,000 acres. The total dry wine production in 1913 was 25,000,000 gallons. To produce this quantity about 180,000 tons of grapes were required, and the wineries paid to the growers for this tonnage prices ranging from \$10 per ton, as a minimum in sweet wine sections, to \$27.50 per ton in dry wine districts in the coast counties. Sweet wine grape prices are mentioned in this connection because some of the districts produce also a large gallonage of dry wine.

The production of sweet wine was 17,134,988 gallons, requiring the use of 212,937 tons of grapes. The price paid to the growers ranged from a minimum of \$10 per ton, on contracts, to \$16 per ton for choice varieties.

The brandy produced and placed in bonded warehouses for the 1913 season was 1,544,245 gallons. To produce this amount 51,475 tons of grapes must necessarily be used, and these brandy grapes were paid for at an average price of \$10 per ton.

It is estimated, therefore, that there was paid to growers during 1913 for grapes delivered to the wineries over \$6,000,000. This raw material made into wine at the 700 wineries in the State, aged and marketed, represents a commercial value at the present market selling prices of close to \$15,000,000.

There were 6363 carloads of table grapes shipped out of California during the fall of 1913, and 1000 carloads either consumed in the State or forwarded in less than carload lots by express shipments to various sections. The average net weight of table grapes in a carload is 26,000 pounds. Therefore, there were 191,438,000 pounds of table grapes sold as such commodity by California vineyardists during the last vintage season. The fruit shipping companies of the State are authorities for the statement that the average gross price realized for the sale of a car of table grapes was \$1250, making the gross sale of table grapes amount to \$9,203,750. Deducting freight, refrigeration, and commission for selling, it is estimated that the grower received for his packed grapes at the shipping point

in California \$950 per car, or \$6,994,850. The money value of the crop is represented by table grape, raisin grape, and wine prices during the season. Ninety per cent of the entire crop is sold outside of California, and the value all told of the above three commodities is close to \$30,000,000. Of this amount, \$27,000,000 of outside money came into California on account of its table, raisin, and wine grape crop of 1913. The estimated total pounds of fresh grapes produced in California in 1913 is 1,800,000,000, or 900,000 tons.

In California there are 330,000 acres of land on which grape vines are growing; 170,000 of these acres are planted to wine grapes, 110,000 to raisin grapes, and 50,000 acres to table grapes. At \$200 per acre, these vineyards represent a valuation of \$66,000,000. Some of the vineyards might be bought for less than \$200 per acre, but many of them could not be purchased for \$500 per acre, so \$200 is considered a conservative average valuation. Packing houses, equipment and some 700 wineries throughout California represent enough additional valuation to bring the total viticultural investment to \$150,000,000 as stated in the beginning.

The following are members of the State Board of Viticultural Commissioners: Mr. C. J. Wetmore, of San Francisco; Mr. H. F. Stoll, of San Francisco; Mr. Paul Masson, of San Jose; Mr. Sheridan Peterson, of Santa Rosa; Mr. Frank T. Swett, of Martinez; Mr. C. E. Bundschu, of San Francisco; Mr. Secondo Guasti, of Los Angeles; Mr. J. E. Beach, of Fair Oaks, and Mr. W. M. Giffen, of Fresno.

The act of the legislature which created this board carried with it an appropriation of \$7500 per year, but the sum has been found inadequate to do the work outlined by the board of commissioners. To as great an extent as it might go with the funds at its command, the commission endeavored to know each individual grower of grapes, his acreage in vines, his varieties and other details regarding his vineyard holding. There are thousands of these vineyardists in the State,

and it has been a never ceasing task on the part of the viticultural office to collect this important data. Returns are complete from some sections of California, but in other sections the checking work is still going on, and in many parts a special representative was sent into the field to meet the growers and obtain data from first hands. The mails are used every day from the office of the commission in the State Capitol Building, Sacramento, in the endeavor to bring the desired information from the growers, and before very long there will be in the possession of the viticultural commission a very valuable roster from which the work of the commission may be directed with greatest accuracy.

One of the most effective accomplishments of the commission has been the standardization of table grapes. This was accomplished in a very successful manner during the past vintage with the assistance of the fruit packing companies throughout California, and to very great extent the growers of grapes.

In addition to this, the Eastern marketers of our California table grapes were made aware of the efforts here, and the Western Fruit Jobbers' Association in convention in February, 1914, in Kansas City, applauded by resolution the efforts of the commission and advised that every handler of California table grapes should use his influence to bring about the desired result in the standardization of our Tokay, Malaga, and Muscat table grapes.

The general source of trouble came from the shipping of the early varieties of table grapes. From almost every section, we found growers anxious to put their grapes into the Eastern market early, regardless of their sugar content. This practice demoralized the Eastern markets because of the bad impression created by early unripe grapes. Shippers who followed these early exports with better grapes and better sugar content found their product almost refused because of skepticism of the consumer brought about by the bitter experience with the first shipments of unripe grapes.

An unsuccessful effort was made recently by the viticultural commission in behalf of the wine people of the State to get their product into Canada on a competitive basis as far as custom duties are concerned with the French wines. The subject was placed before the Department of State, at Washington, D. C., and no satisfaction was obtained because of the fact that the French and Canadian governments have a reciprocity agreement which gives the better of trade to the French exportations of wine to Canada. Later on we may be able to remedy the existing conditions.

At the present time the commission is greatly concerned about the table grape situation in California, and is endeavoring to relieve the volume of what appears to be an over production of table grapes in the State. It has been learned that Spain sends to the United States for winter marketing each year nearly 750,000 kegs, or drums, of Almeria table grapes packed in cork dust. These grapes from Spain have found a ready market all through the Eastern section of the country in the winter season, and have arrived here in a very good state of preservation. The prices realized have been entirely satisfactory, and we have thought if we could lay aside a certain proportion of our table grapes each vintage season for marketing in the East throughout the winter and spring months we would relieve the situation in this State.

The experiment was tried last year in California to a very practical extent, and our best information is that there were packed here during the vintage season just passed between 150,000 and 200,000 kegs, or drums, of Emperor grapes. There was some packing also of our Tokays. We do not have the cork dust to use as a preservative, but we substituted kiln-dried redwood sawdust and we packed our grapes into this material in spruce kegs and veneered drums. The actual weight in a keg, or drum, was about thirty pounds, and the cost of the drum, the sawdust, and the packing was 85 cents. Reports from the firms in California that tried the experiment extensively indicate that these grapes brought \$2.25

f. o. b. California. If the cost of packing were 85 cents per drum, the net figure to the grower for thirty pounds of grapes would be \$1.40, which is a very satisfactory price.

The opinion of the members of the viticultural commission is that Tokay grapes may be taken care of in this way if they are picked and packed at the proper time. In an average year, the Tokays should be gathered between September 10 and 15, just before they reach the time of maturity.

It is probable that the Panama Canal will be used in the forwarding of these packed grapes. Unfortunately, the past season a few Tokays shipped in that way did not arrive in New York in prime condition because of an unexpected delay caused by a slide in the canal at the very time the ship bearing these grapes was about to enter.

Another year may bring about some radical changes in the method of drying and packing these table grapes before they are forwarded from this State. One authority indicates to us that much may be accomplished toward the preservation of the grapes for several months by the use of alcohol fumes; the idea being to first place the grapes in a room, or a large air tight box, and then allow a certain quantity of alcohol to evaporate within the room, or box.

Another concern much interested in this method of marketing is going to suggest a lighter package, or drum, so that some freight may be saved. It is claimed that if a paper drum were used and made air tight, but durable, less sawdust would have to be used, and we would be able to put six pounds more of grapes in the same size package. All of these things will be worked out another year, and the table grape growers should be optimistic about the ultimate results, for something surely will be accomplished in their behalf.

The raisin branch of the industry was never in better condition than during the last three years. The Raisin Exchange, with headquarters at Fresno, has proven an active and successful marketing organization that has brought profit to those who entrusted their production to the exchange.

The California Sugar Industry

By Robert T. Oxnard

Vice President American Beet Sugar Company of San Francisco

Editor's Note: Mr. Robert Oxnard has for many years occupied a leading place among those who have brought capital and effort to the development of the sugar industry of California. One of the most wide-awake and thriving towns of Southern California bears his family name. It is a by-product of the sugar industry of Ventura County, although it has many other resources, also. Mr. Oxnard discusses interestingly the discovery and development of the beet as a source of sugar. He discusses, also, the adaptability of California to the industry and shows that California could, by using only a fraction of her suitable land, produce all the sugar consumed in the United States.

SUGAR in its different forms belongs to the carbohydrate group of food products, as does also starch, and together they form the most nutritive element in vegetable products.

The word sugar however, is usually used to describe "sucrose" or "saccharose" which is derived principally from the sugar cane and the sugar beet, but is also found in a few products of secondary importance, such as the maple tree, sorghum, dates, corn stover and others. Scientifically however, the word also includes glucose, which is the sweetening element found in almost all fruits and vegetables. Honey also belongs to the glucose group. Lactose, as the name implies, is the sugar of milk.

The different starches also can, by chemical treatment be transformed into glucose, and a large industry has been built up along this line, while sucrose is

also transformed by acids into glucose. It is in the form of glucose that all sugars are assimilated by man and beast. It is therefore necessary that in the preliminary processes of nutrition, both sucrose and starch shall be changed to glucose, before they can be assimilated by the body. Of all staple food products sugar passes into the circulation and is transformed into energy the most quickly. As an example of this, the so-called "raids" or long distant races conducted for the cavalry by the different European armies, and which extend over distances of several hundred miles, have always been won by horses trained to drink sugar and water during the journey so that they could be supplied with immediately available food and stimulant.

SOURCES OF SUGAR

The use of sugar from the sugar cane in Europe dates back to the middle ages

when it was introduced from Asia, but the discovery that the same element of sucrose was found in beets was only made in the eighteenth century by the German chemist Margraff.

I will note in passing that at that time the sugar beet only contained 5% of sucrose, while in 1913 the factory of the American Beet Sugar Company in Ventura County, California, manufactured 250,000 tons of beets that averaged 20% of sugar. This metamorphosis, for it can hardly be called anything else, of the sugar beet by selection, is one of the great triumphs of applied science in the industrial world.

The same scientific effort has not been as yet applied to the sugar cane, which is today substantially what it always has been.

RISE OF THE BEET SUGAR INDUSTRY

The discovery of beet sugar remained for some time hardly more than a curious scientific fact. Outside of a few experimental endeavors the sugar producing possibilities of this new plant were neglected until necessity forced Napoleon to utilize them. During his long wars with the rest of the European nations, and particularly with England, which controlled the sea, France was deprived of sugar through its inability to import it from the West Indies, then the principal source of supplies. It is a tribute to the value of sugar in the field of nutrition, that this was a great hardship to the French people. Napoleon by the offer of extraordinary inducements obtained a comparatively rapid development of sugar production in France from the beet.

With the fall of Napoleon, cane sugar again formed the principal source of supply and beet sugar manufacture received a serious set back.

Still the gradual improvement of the quality of the beet enabled it to struggle along in France, its original home, from

which it spread slowly to the other continental countries.

After the Franco-Prussian war, Germany progressed rapidly along the path opened by France, and soon took the lead in beet sugar production, which it holds to this day.

AGRICULTURAL IMPORTANCE OF BEET GROWING

If some Agricultural Edison had proclaimed to the world at that time that he had made a discovery which would make two blades of grass grow where one grew before, no reward in honor and riches would have been considered too great for him.

This however, is the discovery that was made, not at once, but gradually, by the scientific agriculturists of Europe. It was accomplished by that humble vegetable, the sugar beet.

It was found that the introduction into the agricultural rotation of the continent of Europe of a hoed root crop about one year in four had unlocked the stores of fertility hitherto lying unavailable and dormant. The intensive and deep cultivation required by beet culture, and the net work of fibrous rootlets left in the ground by 40,000 beets to an acre, supplied nourishment in available form to the following crop in the rotation, and also left the ground honeycombed with minute channels for the circulation of water and air in the soil.

It is a fact that there is, strictly speaking, no such thing as a worn out soil. Soils that fail to give crops in paying quantities may still contain enough nitrogen for fifty crops; enough phosphoric acid for one hundred and fifty crops; and, in California, enough potash for five hundred crops. The difference between the fertile and the unfertile soil is partly that in the latter the plant food is not in available form. It is this function of making the plant food in the soil available for the next crop that is performed in an

eminent degree by a root crop in the agricultural rotation.

In 1870, when Germany began to grow sugar beets actively, her yield of wheat was about seventeen bushels to the acre, the same as it produced by the so-called virgin lands of the United States. Today Germany has doubled her yield of cereals, while we have stood still, except where beet culture has been introduced.

When this agricultural phenomenon became evident to the scientific agronomists and political economists of the old world, they forced the production of beet sugar, for its collateral advantages, until the supply overrunning the demand brought on a crisis and prices of sugar fell to an unremunerative level. To prevent any backward step, the several governments began to give bounties to their sugar producers, with the result that the production of beet sugar soon passed that of cane in the world, and cane producing countries were driven to the brink of ruin.

WHY ENGLAND DID NOT TAKE TO THE SUGAR BEET

The only highly civilized government of Europe that did not attempt to develop beet sugar production was that of England. This, partly owing to her devotion to free trade; also because, climatically, it is very problematical if the industry can be successfully established there; and again, because the turnip crop takes the place of the beet root in her agricultural rotation.

England therefore became the dumping ground for the surplus production of other European countries. The benefit that she derived was, that her people had cheap sugar and that certain industries using sugar as a raw material, such as the making of jellies and jams, prospered.

As against this, her sugar refining industry was very seriously crippled, and her cane sugar producing colonies were brought to the verge of ruin. Their inhabitants applied to England the term of "the stepmother country."

Largely as a result of this latter situation, England decided to take steps toward the abolishment of bounties in Continental Europe by threatening to refuse to import bounty-fed sugars.

As by this time the farmers of Continental Europe has thoroughly recognized the indirect advantages of beet culture, and sufficiently to prevent the decline of the industry; and as on the other hand the Continental governments were glad to be relieved of the financial strain caused by the bounties, the so-called "Brussels Conference" established an agreement, in which England and all the principal sugar producing countries of the continent, except Russia, participated, this resulted in the abolition of the bounties, while leaving to the industry of each country a measure of protection by tariff duties against all others.

THE BEET SUGAR INDUSTRY IN THE UNITED STATES

So much for the sugar industry of the old world. Coming now to the United States, and leaving aside its cane sugar industry, as not germane to this article, it is enough to say that a few attempts were made from time to time in the last century from Maine to California in the production of beet sugar. They were uniformly unsuccessful, except in California at Alvarado, where the tenacity and ability of Mr. E. H. Dyer enabled him to eke out a precarious existence for his small sugar factory, until the tide turned. The industry that he had established at Alvarado finally prospered and grew until 1913 when it succumbed to the effect of a reduction of the sugar tariff, and the added demoralization produced by the impending shadow of free sugar in 1916.

The turn of the tide in beet sugar production in the United States, spoken of above, came in 1889, when owing to the gradual improvement of the quality of the sugar beet accomplished in Europe and already referred to; and further, to the improvement made in the processes of ex-

traction and manufacture, American capital became interested and two new enterprises were started at Grand Island, Nebraska, and at Watsonville, California. The result was sufficiently encouraging to induce at once further ventures at Norfolk, Nebraska, and Chino, California. From these beginnings others took encouragement and factories multiplied in rather irregular progression.

EFFECTS OF TARIFF TROUBLES

At times it would seem as if a settled policy of protection to the industry was reasonably assured, and the factories would spring up confidently. Then again, the sun of protection would seem to be obscured and progress would be halting for awhile and sometimes even nil.

The necessity for protection to the home sugar industry can be explained in a few words. The production of beet sugar on its agricultural side requires a great deal of actual labor of the hands. The beet seed has to be drilled in the ground in continuous parallel lines and later thinned out to leave one strong, healthy plantlet every ten or twelve inches to the exclusion of 90 per cent of those originally planted. This can only be done by actual contact of the hand or the small hoe in the hand with Mother Earth. Then again, after the crop is matured and plowed out, each individual beet, of which on an average there are two thousand to one ton, has to be taken up by hand and the leaves and crown cut off with a knife. For a factory using 3,000 tons of beets per day, this means 6,000,000 such operations every day.

All the ingenuity of European and American inventors is being constantly exercised toward performing this work by machinery, but so far without success.

So that in the beet sugar industry it is not the case of a laborer that guides a machine that performs the work of a thousand men, and where consequently the wages paid for that laborer are not ma-

terial. Agricultural laborers in the beet fields of California during harvest earn at least \$2.50 per day, and this work can be equally well performed by European peasants working for 40c or 50c per day, or in the case of women, for 30c a day.

LABOR COST IS THE RULING FACTOR

To go further, the cost of everything used and of every operation performed in beet sugar manufacture is principally labor from the "sowing" of the seed to the "sewing" of the sack of sugar, and if we are working with a standard of 20c or 25c per hour for labor we cannot hope to compete with the standard of 3c to 10c per hour in Europe; or, going still further, of 1c per hour in Java.

The cost of factory labor for the actual manufacture of the sugar is comparatively a small item, and not a serious handicap. It is the labor cost as represented in the supplies purchased and in the production of the beets that is serious.

CALIFORNIA'S BEET SUGAR PROBLEMS

As was inevitable in a new field, many mistakes of location have been made. Pioneering in any line is usually expensive to the pioneers, and the rewards generally go to those that come after.

Thus far three states of the Union have taken the lead in volume of output, viz.: Michigan, Colorado and California. It would be interesting to analyze the reasons for this grouping, but it would unduly lengthen this article.

California agriculturally is superior to either of the others. The beets exceed in sugar content, and are of fair purity, but commercially California is badly situated. Her beet factories and her cane sugar refineries produce already far more than she consumes, and the bulk of the product must find an outlet even as far east as Chicago and beyond, at much greater cost in freight than her other two competitors.

The beet sugar industry of the United States as a whole suffers from two se-

rious disadvantages in the marketing of its product. In the first place, the bulk of the 700,000 tons of beet sugar produced is raised in the sparsely settled country west of the 100th meridian, and must find a market to the eastward far from the place of production. In the second place, the bulk of the beet sugar is produced in the late fall and winter, at the time of the smallest consumption of sugar. It is a well-known fact that the consumption of sugar in June, July, August and September is double that of December, January, February and March.

Among the collateral advantages of the beet sugar industry, not the least is the fact that it reverses the drift of agricultural population toward the great cities, which is so deplored by political economists. The industry is essentially one of the agricultural regions, and yet it builds up around it small cities of two or three thousand inhabitants, to whom it gives all the advantages of social intercourse, education, recreation and the comforts and utilities that accompany the grouping of men. Yet it must remain an agricultural community to some extent, or else it perishes.

The value of the beet crop to the farmer; the improvement in other crops that go hand in hand with it; and the grouping of population around the factory all conspire to increase the value of land, surely and rapidly. This has been the universal experience wherever the industry has been established.

WHAT CALIFORNIA MIGHT DO WITH BEET SUGAR

Considering now the sugar industry exclusively from the standpoint of California, it is interesting to speculate what the possibilities of it might be to the State.

California has an area of 155,652 square miles, or say 100,000,000 acres. It produces a ton and a half of sugar to the acre. Consequently it could produce the 4,000,000 tons of sugar consumed in the

United States on approximately two million and a half acres, or $2\frac{1}{2}$ per cent of its area. This product at 5c a pound would have a value of \$400,000,000.

To produce this quantity of sugar would require the processing of 250,000 tons of beets per day, or say only two hundred and fifty factories, slicing 1,000 tons of beets per day. Certainly California could find suitable location for that number within her hospitable borders. Each one of these factories would give of itself through the activities that it fostered employment to 1,000 men, representing a population of 1,000,000 inhabitants devoted to the industry.

These factories would produce as another by-product a million tons of molasses that could be converted into 140,000,000 gallons of alcohol, or otherwise devoted to increasing the ration of the steers and dairy cows of the State. Incidentally, enough cyanide of potassium could be produced to supply all the gold mines of the country—not to speak of supplying California the cyanide which is used for fumigating fruit trees.

In addition to this it would produce 25,000,000 tons of beet pulp and 8,000,000 tons of the beet tops and leaves left in the field after harvest, with which it could fatten 2,500,000 steers annually. The value of the fat steer above that of the feeder is approximately \$25, which would bring an added profit of \$62,500,000.

Without indulging in such dreams and speculations it may be said with the greatest conservatism that if this industry were given proper encouragement in the United States, the share of it that California would most certainly get, owing to the advantages which she enjoys, would make it the greatest and most profitable of the many industries and sources of wealth that she offers with lavish hands to all her children, native and adopted, present and to come.

Growing Vegetables for Distant Shipment *in* Southern California

By H. S. Hazeltine

Secretary California Vegetable Union

Editor's Note: Mr. Hazeltine has prepared an exceedingly interesting review of the production of the chief kinds of shipping vegetables in the eight counties of Southern California; the particular section in which each kind is chiefly grown and the varieties which are most satisfactory in the distant shipping trade. He also indicates the points to which each vegetable is chiefly sent for sale and prepares a table showing the production of each during the year ending September 1, 1914, aggregating more than 5300 car loads for this section of the State alone and for which there is a heavy and continual demand.

SOMETHING over half a century ago gold seekers who came to California from the East and North discovered, after planting vegetable seed brought with them for garden use, that California soil yielded abundantly, and that the vegetables grown were not only large and of nice appearance, but of very fine eating quality. This, together with the fact that vegetables can be grown to splendid advantage in Southern California in the winter season as well as in the summer, has been responsible for the tremendous growth and development of the vegetable raising industry in the State.

The growing of vegetables in Southern California offers an especially attractive field for industry and energy; in the summer time because of the tremendous local demand, and in the winter time because of both local demand and heavy Eastern demand. It is only within

comparatively few years that the business of raising vegetables for winter shipment has become an important one in California, although the first winter vegetables were shipped out of the State as early as the late 70's. As California's cities developed, the demand increased, and acres which had lain idle were put under cultivation in order to supply the demand. Soon the necessity for supplying Eastern markets opened up great possibilities for the industry of vegetable growing, and in a comparatively short time Southern California was in the midst of preparing land and planting, not for home consumption alone, but for the purpose of supplying a constantly growing Eastern demand. It was early in the 80's before the business of growing vegetables for Eastern markets was put on anything like a working basis, and the development of the refrigerator car and other facilities made it

possible to ship tender, green vegetables to far Eastern markets without endangering the product itself.

First attempts at shipping vegetables East met with failure, as the method of handling, packing and loading was crude and inefficient. However, experience and subsequent efforts along different lines brought the cars not only to loading stations but at different points along the line of travel of the car as well. Containers in the form of crates and boxes were manufactured; men learned how to properly pack and crate the vegetables so that they arrived in Eastern markets in satisfactory condition, and with the further perfection of the refrigerator car, and improved methods of growing, came success to the shipping industry, and much additional land was brought into use for the purpose of raising vegetables exclusively for Eastern markets. Cabbage and potatoes were the first vegetables shipped out of the State, and on account of the fine quality of this California stock, sales were ready, and demand for further supplies followed.

THE SOUTHERN CALIFORNIA DISTRICT

What is popularly known as "Southern California" consists of the eight counties at the lower end of the State. Beginning with the most northern, they run along the coast as follows: Santa Barbara, Ventura, Los Angeles, Orange, and San Diego. These are flanked on the east by three large inland counties of San Bernardino, Riverside, and Imperial. It is Southern California with which this article has to deal; not the entire State, although the same vegetables are grown in other parts of the State.

Celery—The history of the celery growing industry in Southern California dates back to 1889, when Mr. D. E. Smeltzer of Kansas City, Mo., formerly a celery grower of Michigan, discovered wild celery growing rank in the peat lands of Orange County. Mr. Smeltzer at once set about preparing some land, and planted a small field of celery. The experiment was so satisfactory that others took up the industry, and in a phenomenally short time thousands of acres of celery were planted each season. The quality of the celery grown in

this peat land was very fine; the stalks were long, crisp, and sweet, and the celery had a fine heart. Eastern jobbers ordered freely, and California celery met with a ready sale. Several varieties are grown in Southern California, the most popular being the "Golden Heart," which is grown from French seed. This variety is a splendid shipper, and of fine eating qualities. In recent years celery growing has been extended to other sections of California, and at this time considerable land is planted to celery each season near El Monte, Cal., the peat lands of that section being well adapted for celery growing. The present season will see about 1500 acres of celery produced in the El Monte district alone, and the acreage is increasing each year.

Much individual prosperity among Californians is due to celery raising alone. Growers consider one thousand dozen bunches to the acre a good yield, and prices have ranged for the last three years from 15 to 30 cents per dozen bunches, according to the season and the various grades. The market for celery is vast, there being practically no market in the United States and Canada which does not call for California celery at some time in the season. California celery growers and shippers are fortunate in that they can grow and ship celery at a time when it matures and is ready for market when other celery is either gone into consumption or not yet ready for shipment. The California season is usually from November 1 until March 1, and usually by November 1 the celery crops of Colorado, Michigan, and New York state have been harvested and are out of the way. Florida celery does not make its appearance on the markets until around the first of February, and the larger portion of the California crop has been moved by that time. California's method of grading and packing celery has met with the greatest favor in Eastern markets. When the celery is cut from the field, the roots and outside stalks are neatly trimmed, and the celery is packed into crates from eighteen to twenty-four inches high, according to the length of the celery. The large and small sizes are kept separate in the crates, and number of



Luxuriant Growth of Celery, stretching away for many acres in apparently converging rows in actual work of harvesting at

dozens to the crate is marked on the crate in plain figures. The usual carload is 160 crates, and refrigerator cars are used exclusively, and kept iced to full capacity until they reach destination.

Potato—Dating back to the earliest days of American settlement of California, the potato has been a popular and profitable crop, and the industry has thrived. In the district tributary to Los Angeles about three thousand acres of potatoes are planted each year. About one-half of this acreage is in the San Gabriel Valley, the balance being south and east of Los Angeles, and in the San Fernando Valley. It is an interesting fact that the Los Angeles market alone takes about ten carloads of potatoes daily during the season. The average yield is around one hundred sacks to the acre, and the average price f. o. b. loading station is around \$1.00 per hundred-weight, the sacks containing about 115 pounds net. In Southern California the best variety grown is the White Rose, and it has proven very popular and profitable as well. New California potatoes are eagerly sought by the trade on account of their superior eating quality. The first crop matures in June, and the normal shipping season is from June 15 to August 15; first ship-

ments being packed in lug boxes, and later shipments moving in sacks. In the San Gabriel Valley there is a very strong organization known as the San Gabriel Valley Potato Growers' Association, organized for the purpose of facilitating the handling of their potato crops. Practically every grower of potatoes in the San Gabriel Valley is a member of this association, and by maintaining a high standard of quality and keeping their output rigidly inspected by experienced inspectors, they have won high favor for their product among the buyers, and potatoes bearing their brand on the sacks bring a premium. The writer mentions this one association to indicate what can be and has been done along this line in the vegetable growing industry. Southern California potatoes are marketed for the most part in Arizona, New Mexico, and Texas, North Pacific points, Utah, Colorado, and Nevada taking a small portion of the crop. Occasionally there is a demand from points along the Missouri River, but this section is supplied usually from Eastern Kansas crops.

Winter Melons—The peculiar adaptability of California soil and climate to almost any variety of vegetable or fruit that can be grown elsewhere is shown in the recent development



California field. In this remarkable panoramic view is shown not only the celery growing but the packing for market as well

of the casaba melon industry in the State. Originally a melon of the Mediterranean countries, the casaba was first introduced into this State about twenty years ago, and while first attempts at growing it resulted in failure, subsequent efforts proved successful, and as early as seven years ago, first shipments of this melon were made to Eastern markets. It has been found that the San Fernando Valley is particularly well adapted to the growing of casabas, and the present season there is no less than 2000 acres of these melons being grown in that district, where they are planted between the trees in young fruit orchards. The "Golden Beauty" and "Pineapple" are perhaps the two most popular casabas of the winter variety. They are ready for market about the middle of September, and bring very good prices in large markets, such as Chicago, Boston, Philadelphia, and New York, all of which markets use straight carloads daily.

Onions—In the Coachella Valley onion growing has been profitable in recent years. The writer recalls one instance last season in which one onion grower near Thermal realized a net amount of about \$10,000 from twenty acres of onions. Of course, last season

was an exceptional one, owing to the failure of the Texas crop, and the fact that import receipts were light. However, these figures will go to show what can be done in Southern California by growing onions. About 300 acres of onions are grown in the Coachella Valley each year, producing around 150 to 175 carloads. These onions are grown from seed imported from the Canary Islands and Bermuda, and the congenial climate and soil of the Coachella Valley are particularly well adapted to their development. The "Crystal Wax" and "Yellow Bermuda" are the two favorites produced in this section, both being large, shapely onions of splendid flavor that has made them tremendously popular. Southwestern markets will take practically all of the onions that Southern California produces each season, although Missouri River markets and as far east as Chicago draw their supplies of onions from California at the time these are shipped, April, May, and June. Other sections of Southern California produce onions, but the best stock is raised in the Coachella Valley.

Tomatoes—During the season from the first of October until the first of January, and frequently later even than that time, California

supplies the markets of the East with tomatoes, and there is always a lively demand for California grown stock during November and December. The foothill districts around Los Angeles provide tomatoes even after the lowland stock has been frost damaged, and in this way California is able to furnish the Eastern dinner table with its tomatoes until after the first of the year. The practically frostless foothill districts near San Fernando, Whittier, and Fullerton produce the finest tomatoes grown in the State. The "Stone" variety has built up the greatest popularity of any tomato known. It is a medium-sized, round, firm, and heavy tomato, of delicious flavor, and very popular in the markets of the United States. The Los Angeles market uses large quantities of tomatoes, and growers reap a nice profit from growing this fruit, especially those who have late fruit in a frostless spot. Practically every mixed car shipped out of the State contains tomatoes as a part of its load, while several hundred straight carloads leave the State each season.

Cauliflower—In the district lying to the south of Los Angeles, between that city and the ocean, there is grown each year a tremendous quantity of cauliflower. The cool, foggy nights of November, December, and January produce wonderfully large and white cauliflower, and there is a marked growth in this industry each year. The "Snowball" variety is most popular with the consumer in Eastern markets, and it is said by experts to be the finest cauliflower produced anywhere. The marketing season generally starts in October and continues until late March. Three crops are planted and arranged so that the early variety matures in October and November; the middle variety in December and January, and the late, in February and March. This gives the grower the benefit of prices at all seasons, and the average crop of cauliflower produces very satisfactory returns. The market for California grown cauliflower extends practically all over the United States and Canada, and prices f. o. b. California loading stations range from 25 cents to 50 cents per dozen heads. Two packages are used in shipping; the pony

crate, which contains about one dozen heads, and the standard crate, which contains around two dozen heads.

Cabbage—The Orange County district of Southern California has always been considered the banner cabbage raising district of the State, and during the season, January to May, trainloads of California cabbage are distributed over the South, North, and East, as well as the Pacific states. Several varieties are produced, but the "Winnigstadt" variety is the best shipper, as well as the best eating cabbage grown here, and its popularity is great all over the United States and Western Canada. There is some "Cannon Ball," "Scotch Cross," and "Flat Dutch" cabbage shipped out of the State, but these varieties do not attain the perfection so distinctive of the "Winnigstadt." Various markets prefer different packages; some taking the standard, or 150-pound crate, while others take the half-crate, containing about ninety pounds net. Good prices are obtained from the sale of early cabbage, and sometimes high prices prevail throughout the season. In addition to the cabbage raised in Orange County, there is a large acreage each season in Los Angeles County.

Lettuce—Lettuce is grown in Southern California the year around, but for shipping purposes the winter variety far excels the summer variety, on account of its hardiness. Recent years have seen a tremendous increase in the acreage of lettuce grown for shipment out of the State, and the industry will continue to grow as the demand increases, which it has done and will do from year to year. The "Wonderful" variety of head lettuce grown in Southern California can not be excelled for quality, and it is a heavy favorite in Eastern markets. Practically every market in the United States takes California lettuce at some time during the season. Pacific Coast points use large quantities of this delicious vegetable during the winter months, while markets along the Atlantic seaboard order it in large quantities as well. Los Angeles County produces the bulk of the shipping lettuce grown in Southern California; the rich, loose, loamy soil of this section being well adapted to the industry. The

average price paid the grower for lettuce is about 15 cents per dozen heads, although prices often go high above this mark.

Other Vegetables—There is some asparagus raised in the Imperial Valley, but the industry has never been fully developed as yet. Artichokes, while grown to best advantage around San Francisco, can be grown in Southern California, but there is no large industry here on artichokes, as is the case in San Mateo County. Beets, carrots, turnips, cucumbers, egg plant, peas, beans, bell and chili peppers, rhubarb, spinach, parsley, radishes, Hubbard squash, Brussels sprouts, sweet potatoes; practically every vegetable known can be grown to splendid advantage in this favored section of California in some or other of its wonderful soils, and there is a continual heavy demand for vegetables of all varieties in mixed and straight carloads. It would be hard to imagine a straight carload of parsley, yet the writer knows of three straight carloads of parsley that have been shipped out of Southern California recently; one to Chicago, one to New York, and one to Boston.

Every Southern California home has its vegetable garden, and strawberries here for breakfast on Christmas are as common as snowstorms in January in the East.

Figures of Shipments—To give some idea of the vast proportions to which the vegetable industry has grown in Southern California the writer has prepared a table showing in approximate figures the number of carloads of each vegetable shipped out of this section during the season beginning September 1, 1913, and closing August 31, 1914:

Commodity	Number Carloads Shipped
Assorted Vegetables	1000
Asparagus	100
Cabbage	500
Cauliflower	500
Celery	1500
Lettuce	500
Onions	400
Potatoes	600
Tomatoes	250
Total	5350

COMMERCIAL VEGETABLE GROWING REGIONS OF CALIFORNIA

Shipments of fresh vegetables from California to Eastern markets are increasing in volume yearly. The principal varieties shipped and the sections in which they are raised are as follows, according to information furnished by the California Vegetable Union:

Artichokes—San Mateo County.

Asparagus—Delta region (Sacramento, San Joaquin, and Contra Costa counties), Imperial Valley.

Beans (other varieties than Lima)—San Joaquin, San Luis Obispo, Sacramento, Sutter, Solano, Contra Costa, Yolo, and Monterey counties.

Beans (Lima)—Ventura, Santa Barbara, Orange, Los Angeles, and San Diego.

Cabbage—Orange, San Mateo, and Los Angeles counties.

Cantaloupes—Imperial Valley, San Joaquin, and Sacramento valleys.

Cauliflower—Los Angeles and San Mateo counties.

Celery—Orange, Los Angeles, Sacramento, and San Joaquin counties.

Lettuce—Los Angeles and San Mateo counties.

Onions—Delta region.

Peppers—Orange, Sacramento, and San Joaquin counties.

Potatoes—San Joaquin, Contra Costa, Monterey (Salinas), Santa Barbara (Lompoc), and Los Angeles counties.

Rhubarb—Alameda, Los Angeles, Imperial Valley.

Sweet Potatoes—Merced and Stanislaus counties.

Tomatoes—Los Angeles County, Merced County, Delta region, Yuba and Alameda counties.

Watermelons—Stanislaus and Merced counties, Imperial Valley.

The Potato in California

By Eugene H. Grubb and W. S. Guilford

Authors of "The Potato," Published by Doubleday, Page & Co.

Editor's Note: Messrs. Grubb and Guilford are well known potato experts. Their joint treatise, entitled "The Potato," is the standard authority on American potato growing. Mr. Grubb is a practical potato grower and has served as expert on the tuber for the United States Department of Agriculture and as consulting expert for many enterprises, public and private. Mr. Guilford has been for some years director of agriculture for the Sacramento Valley Irrigation Company, after performing similar service in Idaho.

IN NO OTHER place on earth where potatoes are grown is there such a diversity of conditions and methods as in California. Potatoes can be planted and harvested every day in the year and in the Delta district in the San Joaquin and adjoining counties they are sometimes being planted and harvested the same day in the same field.

The "Irish" or white potato is a cool weather crop, that is, the tuber develops and matures to its greatest perfection in well-aired, porous, moist, well-ventilated and fairly cool soil, with warm growing days and comparatively cool nights. Corn or melons, on the other hand, delight in hot days, hot nights and hot soil.

The potato thrives in the Northern hemisphere in Northern latitudes at low altitudes; in Southern latitudes at high altitudes and in some Southern latitudes at low altitudes where fogs or other coast influences prevail, or where moisture conditions maintain a cool soil in spite of climatic conditions; also in low altitudes in Southern latitudes during the cool season of the year.

In the high mountain valleys of the Sierra Nevada and Coast Range mountains; in the hot interior valleys; in the lower coast valleys, and in the great Delta of the San Joaquin and

Sacramento rivers—potatoes are profitably grown.

WHERE POTATOES GROW WILD

In the high valleys potatoes are planted after danger from frost has passed, and they grow and mature in 110 to 120 days—requiring practically all of the growing season under these conditions. A potato of fine quality is grown, which is admirably adapted for seed in lower altitudes, and if proper attention is paid to seed selection and cultural methods, maximum yields may be obtained. The potato grows wild in the Rocky Mountains in conditions similar to these—and there is room for greatly enlarging the industry in these favored sections of California. This is practically true of the seed potato business for supplying the lower districts.

Two districts in the lower valleys on the Pacific Coast are noted in all of the Western states for the quality of the potatoes produced and for the high prices paid for them. These are Salinas and Lompoc. The areas are comparatively small, but a combination of a fine, easily handled, rich soil, and a climate tempered by the ocean to just the right degree, make possible the production of a large tonnage of clean-skinned, even potatoes that are in demand by the high-class trade.

On sandy loam, alluvial soil, or other mellow rich soil that is easily worked, in the hot interior valleys of California, two very satisfactory crops of potatoes per year may be grown if irrigation water is available, and if they are planted very early and very late, so that the intense heat of the midsummer season is avoided and advantage is taken of the growing weather during the spring and fall. The first crop is planted in February and harvested in May, the second crop is planted late in August and dug in November.

In the great Delta region, where peat and silt deposits of ages are reclaimed from overflow by levees and pumping; where the soil is always moist and cool, potatoes are planted at any time and harvested when ripe, or later, if the market conditions are not favorable. This is the largest single district in acreage and tonnage produced in the State or in the West. Here the water table in the land is lowered by pumping, so that the potato plant may root and produce tubers, and when irrigation is necessary the pumps are stopped and the water table rises, thereby supplying the necessary moisture. The land is held in large acreages by the men who have reclaimed it, and is rented to tenants for cash or share rent. The tenants are largely Japanese and Chinese.

Growing potatoes in California is much the same proposition that it is everywhere. There must be a mellow, well-aired, porous soil—and in order that this soil may be kept in proper condition of health, the potato crop must be one in a rotation that includes one or two years of grass. For instance, potatoes one year, possibly two; grain or corn one or two years; alfalfa or other grass one or two years; then potatoes again. Soil fertility must be abundant and for maximum yields growers should not hesitate to use commercial fertilizers to supply phosphorus and potash where these elements are not readily available.

The best yields are produced when an ample supply of seed is used. The practice of the best growers everywhere in the world is to use whole seed: That is, to plant the whole potato without cutting. This requires a ton of seed

or more per acre, while if the tubers for seed are cut in small pieces (to one or two eyes) only 500 to 600 pounds per acre is needed. The reason for increased yields from the use of larger seed is that the additional nutriment supplied in the larger seed piece makes a stronger, more vigorous and more capable plant.

The distance of planting depends on the fertility of the soil somewhat. There should be plants thickly enough together in the row to fill the aerial and root area—leaving room for the formation and development of the tubers. Rows three feet apart and plants twelve inches apart in the row is a good planting distance. It is important that there be a good stand; lack of this is a great source of decreased yields. Cultivation must be sufficiently frequent to destroy weeds and to keep the soil mellow, open and well ventilated.

Diseases common to the potato in all parts of the world, such as *Rhizoctonia*, *Fusarium*, wilt and scab, are combated here, as everywhere, largely by the use of clean seed on clean land. It is good to disinfect seed by soaking it for two hours in a mixture of one pint of formaldehyde and thirty gallons of water. Tuber-moth and eel-worm are also present, but can be controlled by using clean seed on uninfected land and using care in the storage of seed.

In California potatoes yield from 100 to 400 or more sacks, of about 120 pounds each, per acre; that is, 12,000 to 48,000 pounds, or 200 to 800 bushels, where properly grown. As is the case everywhere, some fields always fail from one sort of neglect or other. It costs from \$35 to \$60 per acre to grow a crop. Prices range from 50 cents to \$2 and higher per hundred, depending on the world's crop and the local supply and demand.

The potato is the greatest food crop grown in the world, and one that is of great importance in California and the Pacific Coast. By increasing the acreage in favorable territory, not now growing the crop, and by better cultural methods in the districts now famous for the production of the crop, the yields and total tonnage produced can easily be doubled.

Truck Farming *in* California

By E. J. Wickson

(*Editorial*)

TRUCK farming is an important industry in all parts of California and has attained very unique and profitable development. A large export product is sent both by rail and sea to distant markets—the total annual exports of “green vegetables” aggregating nearly 15,000 carloads when growing and marketing conditions are favorable. Of this amount usually about one-tenth is in the form of “canned vegetables,” the balance freshly gathered from the fields.

It is a striking fact that storage of fresh vegetables is not necessary in California. The mild California winter does not freeze hardy vegetables, consequently they are allowed to grow until the shipping season arrives, as in the case of celery, cabbage, parsnips, salsify, etc., or are gathered, sacked, and placed under some cheap shelter from the rains, as in the case of potatoes, beets, carrots, etc. No storage pits nor cellars are thought of. In fact, the most direct and cheapest method of loading cars is employed in many instances, for railway spurs are carried right into the center of the celery, cauliflower and cabbage fields, the crates filled and the cars loaded from the ground on which the crops are grown. This not only reduces the cost of handling and eliminates the cost of storage; it enables the grower to supply the winter and spring markets on the Atlantic side, in the Middle West and the great interior plateau, as well as the North Pacific Coast territory of the United States and Canada, with vegetables fresh from the soil.

No part of the United States except an ad-

jacent district of Arizona and the south end of Florida, enjoys a winter temperature which makes such a traffic possible, and even those small outside areas which have similar temperature do not have other conditions of growth like those of California. It is evident that in the future development of the Western half of the continent of North America and in the unfolding of North Pacific countries generally, California is to be the source of fresh vegetables during the many months of winter which prevail in those Northern latitudes. For this traffic California enjoys not only suitable growing conditions, but has also the advantage of nearness and of transportation by water. No matter how great, then, the Eastern movement of winter-grown vegetables may become, the Northern and North-western movement of which California will have a monopoly, will induce additional production to an extent which can not now be foreseen, although the present traffic in those directions is considerable and profitable.

California has in different parts of the State large areas of land excellently adapted to the various export vegetables which are proving profitable. The soils are various, and yet all in the truck-farming class, viz.: deep, sandy and medium loams of the plains, warm, easily worked and rich; alluvial soils of both ancient and recent origin, holding moisture well and full of plant food; peat and sediment soils, reclaimed in vast areas by dykes, as in Holland, exceedingly productive and particularly adapted to the great crops of celery and asparagus which are made on such lands. All

such soils delight the truck farmer, each according to the demands of the plants which he chooses as his main lines, and they, in connection with the favoring climate, enable him to accomplish greater things than are usually possible elsewhere. There are fine opportunities for investment and effort in these directions.

But the growing of thousands of carloads of celery for the Atlantic cities, beans for Boston, cabbage for St. Louis, potatoes for Texas and all these and other things for distribution from Denver and Chicago, does not constitute the only opportunity in vegetable growing in California. The output of canned asparagus, peas, beans and tomatoes is large and canners are always on the outlook to contract for their supplies. Beyond this, however, there still remains market gardening to supply California cities and towns and the popular resorts of tourists. The work is often very satisfactory and profitable. The local supply of fresh vegetables is scant and many towns and villages are largely dependent upon rail shipments from distant cities. The result is that the consumption of vegetables is less than it should be and less than it would be if local growers would bring their superior products prominently to the attention of consumers.

Formerly it was held that as Orientals and Mediterranean people were growing vegetables, settlers of other nationalities could not compete with them, but it has since been demonstrated that Americans and others of higher intelligence can successfully compete because they make better use of implements and of water, and also understand better the importance of getting the best seed of the best varieties. By attention to these matters, better vegetables are produced and buyers soon learn to discriminate in their favor. Many fruit planters have supported themselves by growing vegetables and small fruits for sale while their fruit trees were growing and some have found that vegetables paid better than fruits, as in the case of one lemon grower, who secured more money from his cabbages than from his lemons. Of course, vegetable growing is not

likely to be profitable unless one understands its requirements and is willing to do the work which it calls for. But with good land, with irrigation water to be used when needed, and with enterprise in growing the best and in letting people know it, a good living can be made in many places which at present have no satisfactory supply of garden products.

The principles underlying success in vegetable growing are universal, but the methods in California are quite different from those applied elsewhere. Here the garden runs practically all the year in the open air. All during the winter, except on the mountains, successions of hardy vegetables are grown. Green peas, small onions, young beets, carrots, new potatoes, etc., can be ready at New Year's and continue for nine months, if desired. Asparagus begins in February and runs until May or June. Globe artichokes cover about the same season. Tender vegetables, sweet potatoes, tomatoes, beans, corn, cucumbers, squashes, melons, etc., are safe in the open air from April till October.

Lettuce, radishes and other relishes can be had all the year, and the same is true of garnishing plants. No attempt is made to enumerate all the vegetables—just enough are named to give the reader in a wintry country a clue to groups which he can fill out for himself from what he knows of other plants similar in character.

With prompt work, energy and a small irrigation supply, the grower can double his old gardening season in California. As a hardy, winter-growing crop is cleared from the ground, its place is taken by a summer-growing crop, and as that matures, the ground is cleared again to start, in the fall, the next winter-growing crop—and so the rotation is continually kept up until it is desirable to take a new piece of land for garden purposes. This practice can be pursued on small beds for the house garden or on larger areas in market gardening. If a man likes to have something always growing and if he wishes always to have something to keep him profitably busy in the open air, the California garden and truck field will please him to the utmost.

The Lima Bean *in* California

By Parry R. Cole

Manager The Lima Bean Growers Association

Editor's Note: The lima bean is California's greatest bean—not because one can have fresh fruit from this delicate plant for the holiday menu, if it is grown in our thermal places, although that is a distinctive California blessing. Commercially the lima bean is great for its dry shipping product, because, though a climbing bean, it can be grown without supports, being allowed to run freely over the dry surface soil without danger of mildew, because our summer air is so dry. And yet the lima bean does not tolerate high heat in its dry air. Therefore its region is restricted to the Coast valleys. Mr. Cole not only describes the product and the conditions under which it is produced, but discusses the growers' achievements in its marketing.

THE LIMA BEAN, as far as records show, seems to have its starting point in Peru, South America, and it is generally understood that the name "lima" is taken from the city of Lima, the capital of Peru.

It seems that about the year 1870 a sailing vessel anchored off the coast of Santa Barbara County and some of the sailors who came ashore near Carpinteria, at that time a small village in Santa Barbara County, had some of the Peruvian dry lima beans in their pockets which were shown a rancher who, being of an experimental mind, persuaded the sailors to let him have all the beans they had in their pockets, as he wished to plant them to see if they would grow in this climate and be of value as a crop. From the information I can gather, the first crop was "poled," that is, sticks were placed in the field so that the vines could climb and twine around them, but by continued cultivating and experimenting

this same bean is grown without poles as supports; owing to the absence of rain during the growing period the vines can trail along the ground without danger of damage from moisture.

These beans are grown to some extent on the Island of Madagascar, off the Eastern coast of Africa, but there is no place in the world where the lima bean is so universally cultivated as in the United States, and the only state that grows them extensively as a field crop is California. Even this territory is limited to a very few counties, of which Ventura is the largest producer, supplying the markets of the country with the bulk of the dry shelled lima beans.

The other counties of California which grow them as a field crop are Orange, Santa Barbara, Los Angeles, and San Diego. Even this area is limited to a narrow strip of about twenty-five miles wide from the coast and

250 miles long, but the bulk of the beans is grown along the coast, extending not more than ten miles inland.

A Product of Climate—Climate is the principal factor for the production of lima beans. All varieties of beans are susceptible to cold, but no variety is as easily hurt by the cold weather as the lima bean, therefore it is useless to plant the seed until the ground becomes warm and "mellow," because the seed would be likely to rot and not germinate and even if it did not rot, the plant that did come up out of the ground would be stunted by cold and would not produce anything.

Ventura County seems to be especially adapted to the growing of these beans, because in this county the crop averages from twenty to as high as forty 80-pound bags to the acre, while in other counties the average is from ten to twenty 80-pound bags to the acre.

In the Eastern part of the United States the beans are grown extensively as a garden product, the gardeners disposing of them mostly as green shelled beans or as green limas.

The production of lima beans is limited; owing to climatic conditions, as already stated, the plant can not stand extremes either of heat or cold. It is necessary to have warm summer weather with fogs at night and early morning in order to produce a crop. This is why these are grown along the California coast, where the climate is of a moderate temperature with remarkably constant fogs in the night and morning throughout the growing period. It has been stated that limas will "make a crop out of fog."

Soil of course has a great deal to do with the profitable production of a crop, but not nearly so much as climate. This variety of bean is grown on soil ranging all the way from sandy to adobe.

Preparation of the Land—The fields are plowed as early as possible after harvesting so that when the winter rains do come the land is in shape to absorb all the water, and the rains soften up the land so that it can be worked easily and made as mellow as silt. The growers have learned from experience that thorough preparation of the land pays. In

fact, the land is cultivated as carefully as if it was a small garden tract, for the weeds must be kept out before the crop is planted as well as afterwards, and you might say the land is being prepared or cultivated continuously, except winter months, from one crop harvest until next crop harvest.

Planting—Planting begins about the middle of April and continues throughout May and sometimes into June; depending on weather conditions, as the land must become warm so as to get the plant up out of the ground quickly.

Years ago about forty pounds of seed was planted to the acre, but this has been increased until now we find the growers planting eighty and a hundred pounds to the acre; but the growers have learned from practice that it was to their advantage to increase the amount of seed per acre, for they got a better "stand"; more plants come up, and this is very essential, as a good "stand" is a long way toward a crop. The seed is put into the ground by a bean planter in rows about thirty inches apart, three to four inches apart in the row, one or two beans being dropped in a place.

There is some difference of opinion as to the best distance between rows. Some growers have tried planting but twenty-four-inch rows with good success, but thirty-inch rows seem to be the popular planting by the average grower.

The seed is put into the ground with a planter which makes a furrow or ditch, depositing the seed about two inches under the ground, down to the moist soil so the bean will absorb the moisture, germinate, and get up and out quickly.

Cultivation—When the plants are up they are cultivated several times, keeping down the weeds and also loosening up the soil, keeping the moisture near the top of the ground. Of course, this cultivating ceases when the plants get too large, as the plants, not being provided with supports, or poles, cover the ground between rows, thus using the land to climb on in place of poles. Should there be any weeds come up after cultivating ceases they are cut out with a hoe.

As there is seldom any rain from planting to harvesting, the land becomes quite dry, therefore there is little danger from moisture discoloring the beans from the vines trailing along the ground.

The past few years artesian wells have been put down and the growers have found it profitable to irrigate their beans during the growing period and in many fields crops have been increased by one-fifth to one-half. One of the drawbacks to irrigation is making weeds grow, and unless the land is cultivated immediately afterwards the surface becomes baked very hard, allowing the moisture to dry out quickly.

Harvesting—The beans in the earlier sections ripen about August 15. The vines are cut with a sled cutter having two runners about fifteen inches high. On the inner side of each runner a knife is fastened diagonally, slanting backwards and toward the center of the sled. About six inches above the knives are two small rods of iron which push the vines into the center as cut, making one windrow out of the two rows cut. The runners on the sled cutter are far enough apart to cut two rows of vines at one time. This sled is drawn by two horses and the knives cut the vines just below the surface of the ground. One cutter will cut ten acres per day. The vines after being left in windrows for a few days are piled by hand with pitchforks, usually three windrows into one row of piles to remain until very dry, which length of time varies with the weather and maturity of the beans, but usually two to three weeks, sometimes even four weeks. One man will pile on an average of three acres per day. It takes at least three men to handle the cut vines from one sled cutter.

After the vines become thoroughly dried the piles are gathered up by men with pitchforks into a wagon with a bed similar to a hay rack, and taken to the threshing machine. The straw, pods, etc., are separated from the dry beans which are sacked, hauled to the warehouse to be cleaned by the bean cleaner, which takes out the remaining sticks, pods, lumps of dirt, small and split beans, and

from here put up in even weight bags with the net weight stenciled on each bag, loaded into cars or on steamers and shipped to the markets of the world.

Valuable Straw—The bean straw which is separated by the threshing machine is put into bales and used for feed for cattle and horses. Of course a great deal of the straw is scattered over the land and plowed under for fertilizer. Years ago the growers used to burn this straw, but they learned from experience that there was a great deal of nourishment in this for cattle and that they would get fat on it; also today there are more growers scattering this straw on their land and plowing under than ever before because they have been taught from experience that it enriches the land.

Striking Facts—Possibly to the majority of people, the growing of lima beans in California is rather small farming, because they have in mind the growing of lima beans in other sections, but all one has to do is to get on Coast Line train at Lompoc, Santa Barbara County, during May, June, July or August, and ride to San Diego, a distance of about 250 miles, and on all sides you will find lima beans growing. One will ride miles and miles and see field after field without a fence to divide ownership. These will appear in one continuous green stretch as if a lawn.

South of Los Angeles is one ranch which in 1914 had in lima beans about 20,000 acres. The crop off this ranch was nearly 250,000 bags, basis eighty pounds each, or 20,000,000 pounds, selling for nearly \$1,000,000.

In Ventura County the returns from the lima bean crop grown by individual growers range from \$2500 up as high as \$125,000, therefore if any one thinks bean growing in California is on a small scale, let him change his mind right now.

The most of the large ranch holdings are rented to growers in from 50 to 300 acre tracts on a crop rent basis; that is, the renter delivers to the landowner a certain percentage of the crop raised, which varies according to quality of the land, as a yearly rental. Some landowners furnish the stock, farming tools,

etc., while others make the renter furnish everything.

Marketing—Only about fifteen years ago lima beans were a drug on the market, with only an annual crop of about 600,000 80-pound bags. The growers could only get \$1.15 to \$1.50 per hundred pounds for their beans and then there was always a carry-over from one year's crop into the next year of from 50,000 to 100,000 bags, but in the year 1909 the largest growers in Ventura County got together and made up their minds that they were tired of having the market manipulated by a few dealers at the expense of the growers. They declared that co-operation among the growers was their only salvation if they expected to get a fair price for their crops.

They called a mass meeting of the growers, incorporated under the name of Lima Bean Growers' Association, rented an office, employed their help, including a manager, and appointed brokers in all cities in the United States and Canada and went after the business the same as the dealers were doing, but instead of working a few markets they went after all markets, opened up new ones by advertising, demonstration, and shouting to all the virtues of the California dry lima bean, and today I venture to say there is no jobber in the United States, large or small, who does not handle California dry lima beans.

In visiting the cities of the United States you will hardly find a restaurant or hotel that does not have on its bill of fare lima beans as one of its vegetable dishes.

The Growth of Production—Since the association has been in business there has never been a year with a carry-over. Each year's crop was cleaned up by the time the new one was ready for market.

In visiting the cities of the United States you will hardly find a restaurant or hotel that does not have on its bill of fare lima beans as one of its vegetable dishes.

To show how fast the consumption and crop have increased, the following figures are given, basis eighty pounds per bag:

Year	Yield
1907.....	900,000 bags
1908.....	1,000,000 "
1909.....	1,050,000 "
1910.....	1,175,000 "
1911.....	1,300,000 "
1912.....	1,200,000 "
1913.....	1,050,000 "
1914.....	1,500,000 "

In the year 1911 the total acreage was about 95,000; in 1912, 103,000; 1913, 115,000; 1914, 116,000.

Estimated yield by counties of 1914 crop, basis eighty pound bags:

Ventura	1,000,000
Orange	260,000
Santa Barbara.....	100,000
Los Angeles.....	75,000
San Diego.....	65,000
	<hr/> 1,500,000

The 1914 crop lima beans will bring to the farmers in California in the neighborhood of \$6,000,000 to \$6,250,000, therefore growing of lima beans is one of the principal industries in California.

A great deal of the acreage planted to beans in Ventura, Orange and Santa Barbara counties is in orchards where they either have young lemon or walnut trees. They utilize all the space in between the trees in growing limas until the trees get so large they shade and draw the moisture from between the rows. When this time comes, of course, they must quit planting anything except cover crops there.

If the consumer would only realize the food value of lima beans he would find them one of the most important products placed on the market today and which should be on every family table in some form or other. They can be served boiled, baked, in soup, and even as lima bean pie, which is one of the tastiest pies made if properly prepared.

CALIFORNIA has gathered to itself the products supposedly limited to many other climes and there is little of value grown in the tropics, the Orient or in European lands that will not thrive in this State.

Alfalfa *in* California

By Gerald D. Kennedy

Field Expert of the California Development Board

Editor's Note: Mr. Kennedy discusses alfalfa, the greatest forage plant of California, from the point of view of a recent careful and extended survey of alfalfa growing in this State made by the experts of the State development board. His article is therefore the closest and most up-to-date review of the subject, and its details of methods, policies, and appliances will be found of the highest practical value to those contemplating investment of personal enterprise on an alfalfa basis.

THE word alfalfa is derived from the Arabic meaning "good fodder," and in this State it has proven itself worthy of the name. It was first planted in the inland valleys, but at the present time it is a staple crop from the Mexican border to the Oregon line. As a rule, situations open to direct coast influences are not adapted to the growing of this crop.

CLIMATE AND SOIL

A long, warm growing season is desirable, the longer and warmer the summer the larger the crop, other conditions being equal. The only effect cold has on the established plant is to stop the growth, so it lies dormant during the winter months. Frost is apt, however, to kill the young plant as it sprouts through the ground; it is not free from danger until the third leaf has appeared.

The ideal soil is a well drained loam with a depth of ten or twelve feet. However, the crop thrives on a great variety of soils, from a light sandy loam to a heavy adobe. It is also grown successfully on soil only four feet in depth. Alfalfa should never be planted in soil where the water level is within four feet of the surface or where there is too much acidity in the soil which some times happens when

wheat or corn has been grown for a number of years on land not naturally well drained. It does not follow that all worn-out grain land is acid, as many of our most successful plantings have been made on such land. A simple test for acidity is to make a cut in the soil and insert a piece of blue litmus paper. After remaining in the ground for several hours the litmus paper should be examined; if it is pink in color, it is proof of acidity. The remedy for acidity is the application of lime; 500 to 1000 pounds is usually sufficient for an acre. Our California soils usually contain enough plant food; if they are lacking in anything it is apt to be humus, which may be replenished by plowing under some cover crop. For quick results rye is very effective. Alfalfa gathers its nitrogen by means of bacteria, which are found in small nodules on the roots. These bacteria must be present if the alfalfa is to flourish; if they are not found in the soil they must be furnished artificially. Either the seed or the soil may be inoculated. Preparations are sold for the treatment of the seed. Soaking the seed in solution made from the soil of a healthy and mature alfalfa field is an economical method of inoculation. Soil from an old stand of alfalfa is sometimes spread to the extent

of about 400 pounds to the acre before planting, or manure from alfalfa fed animals may be used. All of these methods have given satisfactory results. Alfalfa will stand a little more alkali than the average plant; this is especially true after the field has a start.

WATER REQUIREMENTS

Irrigation is necessary to obtain the maximum yield in this State, though in many places it flourishes without the aid of it. Hence the first thing to develop on a prospective alfalfa field is the water. On unirrigated fields the gophers and squirrels are a menace and it is sometimes necessary to apply water for the sole purpose of drowning them out. The only time that it is unadvisable to use water is when the alfalfa is being grown for seed purposes, because a thin stand is desirable and the seed is hardier.

Water for irrigation may be obtained in several ways, by acquiring a ditch right in some irrigation system, sinking a well and pumping, or using the water from some nearby stream. Water from a ditch costs from \$1 per acre per year up, depending on the location. Under ordinary conditions the cost of pumping water is about \$4 per acre per year. If a pumping plant is the source of supply it is always best to use a reservoir, as it lessens the cost of handling the water. The cost of installing a pumping plant capable of irrigating twenty acres would be approximately as follows:

Sinking 200 foot well.....	\$300.00
Installing pit.....	50.00
Motor and pump.....	300.00
Reservoir 50x50x4.....	55.50
Total	\$705.50

If a gasoline engine is to be used the cost would be about \$100 additional.

It is impossible to state the amount of water that is necessary, as it varies under different conditions. Light sandy soils require more water than heavier soils, as they do not hold the moisture so well.

In order to facilitate irrigation the land is usually checked, the details of which will be taken up later in this paper. It has been found by experience that frequent shallow irri-

gations are more desirable than heavier ones at greater intervals. The most practical way of applying the water is after each cutting as at that time the water flows quickly over the ground. The water should never be allowed to stand on the field in warm weather for more than a day, as it is apt to kill the plant. Young alfalfa should never be watered until it shows signs of distress, the idea being to make the roots go down and seek moisture. Where only a small quantity of water is used, it is often applied by means of movable slip-joint pipe.

PREPARATION OF THE LAND

Land that is to be planted to alfalfa should be broken a year ahead of time if possible. Deep plowing is the first essential in preparation. After the land has been worked up, it is ready to be checked and leveled. These preparations are done at the same time, the checks are made by throwing up small levees, rarely more than twelve inches high as the mowers and rakes have to be driven over them in harvesting the crop.

There are various methods of checking; in ground with an even slope, strip checks may be used, 25x300 feet is a satisfactory sized check. In fairly level land the square check is advisable; 80x80 feet or 100x100 feet are good sized checks. Where the ground is rough, contour checks are often used. The idea in checking is to get the land in such shape that water can be applied economically and quickly; this fact should never be lost sight of. Ditches should always be put on the highest ground and if the fall is enough to cause washing, "drops" should be put in. Head gates to control and facilitate the handling of the water may be made out of wood, concrete and galvanized iron. The cost per acre for concrete gates is about \$5 and for wooden gates \$2. The leveling and checking is done with a four-horse scraper and the cost varies from \$5 to \$35 an acre, figuring the man and scraper at \$6 per day. Light sandy soils are more apt to be unlevel than the heavier lands, therefore there is more dirt to be moved. "Hog wallow" lands are very unlevel, but those

where the mounds are close together are easier to level than are those where they are far apart. Before seeding, water should be turned into the checks to see that they flood properly; a good stand of alfalfa can not be obtained unless this work is well done.

SEEDING

Spring seeding is preferable in most parts of the State, as there is less danger of frost at that time. Before planting the ground should be thoroughly worked and the under surface packed, as alfalfa does best in a firm seed bed. The seed may be either drilled or broadcasted. Drilling is preferable as the seed is scattered more evenly. Twelve to fifteen pounds is generally sufficient seed to sow to the acre; the price varies from 15 cents to 20 cents a pound. The cost of seeding would then be from \$2 to \$3.50 an acre. The actual cost of sowing the seed is negligible. It is never advisable to sow a nurse crop, because it uses moisture and food that is needed for the young alfalfa plant.

VARIETIES

The alfalfa that is ordinarily grown in this State is the Chilean, and it is the variety that has proven most successful. Turkestan is a hardier variety and withstands the cold and drought better, but the quality of hay is not so good. Arabian is a short-lived variety that is used to advantage for rotation purposes where the stand has to be plowed out in a few years. Peruvian alfalfa is still in the experimental stage in this State. The advantages claimed for this variety are a longer growing season and therefore a greater tonnage. Before planting any seed it is advisable to send a sample to the University of California to have it tested for weeds and germination. This does not cost anything and often may save a great deal of trouble and expense.

CARE OF ALFALFA

When the young alfalfa is up about six inches it should be clipped to strengthen the plant and to delay the weed growth. It should never be pastured the first year or when the ground is damp, as it is easily tramped out, especially by hogs. By pasturing too heavily

it is apt to be injured, as the animals will eat too close to the crown. Disking the field in the winter is often of great benefit and it is also advisable to apply all of the manure at hand. Superphosphates can be used to good advantage on light soils. The cost is about \$20 a ton and that is sufficient for six or seven acres. The friability of heavy soils may be improved by applying 300 to 400 pounds of gypsum to the acre; the cost is about \$10 a ton. The common practice in California is to apply lime instead of gypsum.

HARVESTING

It is very important to cut alfalfa at the right time. It has been found that the most nutriment is in the hay when it first starts to blossom; at this time the young shoots are also leaving the crown. The haying season starts in April and where conditions are favorable a crop is cut every four weeks until the frost comes. One man and a two-horse mower can cut eight acres a day.

The hay is allowed to lie in the swath until the stems can be bent without exuding moisture which usually takes a day, sometimes less and sometimes more, depending on the weather. The hay is then thrown up into the windrows by means of a two-horse rake. A rake can take care of two mowers; from the windrow it is forked up into small shocks. One man can shock about eight acres a day. The hay should be removed from the field as soon as possible. The sooner it is hauled the less danger of losing the leaves, which contain most of the nutriment and the sooner the water is applied the better for the next crop. Cost of harvesting a ton, figuring the crop on a two-ton basis:

Mowing (8 acres per day).....	\$.25	per Ton
Raking (16 " " ").....	.12½	" "
Shocking (8 " " ").....	.12½	" "
Hauling and stacking.....	1.00	" "
	<hr/>	
	\$1.50	" "

If the crop is lighter than two tons, the cost of handling would be about the same; therefore it would increase the cost per ton.

YIELD

The first year only two or three cuttings are obtained and after that the yield varies from four to ten tons per acre per year. The average

yield throughout the State is 3.5 tons, though in a great many sections the yield is greater, in fact some sections average ten tons. Under favorable conditions the grower can expect an average of six or seven tons to the acre. The first cutting is usually weedy and often used for silage on that account, as it would not command the same price for hay as the later cuttings.

PRICE

The price of unbaled hay varies from \$3 to \$10 a ton, depending on the season. In the stack 512 cubic feet is considered a ton. For shipping purposes the hay must be baled. Baling costs from \$1.75 to \$2.00. The price of baled hay varies from \$6 to \$13 a ton. Small bales weighing from sixty to eighty pounds are preferred. A man can secure better prices for his hay by feeding it to dairy cows and hogs. The average dairyman estimates that his cows pay him \$12 per ton for his hay only. This depends on the cow, though naturally alfalfa and dairying go hand in hand.

PESTS AND DISEASES

Dodder, a yellow clinging plant, is the worst pest of alfalfa in the State. With the proper care, there is no danger from it, for it usually comes from using foul seed and for this reason a careful test of the seed should be made before planting. Small patches of it in a field can be destroyed by heaping straw on the affected piece and burning it. Gophers and squirrels are serious pests in unirrigated fields; where water is obtainable they are easily kept in check. In some sections the stand is fouled with Johnson and Bermuda grass. Such fields should be carefully pastured or the hay cut early in order to keep them in check. To eradicate them entirely would necessitate the plowing up of the alfalfa.

RENTING AND SELLING

It is a common practice to rent alfalfa fields, particularly for dairy purposes. The rental depends on the stand of alfalfa. Sometimes it is rented on shares, but usually for cash, to be paid in several installments through the year. The price is from \$10 to \$25 per acre a year, averaging about \$15.

Alfalfa land is sold at all prices up to \$300 per acre. A great deal of it is held in the unimproved condition at \$150 per acre, and unless the price is influenced by proximity to towns, this is all one should pay for such land. Land already planted to alfalfa can be bought for \$150 to \$400 an acre.

ALFALFA SEED PRODUCTION

This is carried on extensively in Modoc, Lassen and other mountain counties and in the Sacramento and San Joaquin valleys. Land for seed production should not be wet and yet it should be moist enough to mature the crop without irrigation. Sandy lands are not adapted to growing seed crops. The stand of alfalfa should be thin so that the sunshine and air can reach to the crown of the plant and the seed be produced the entire length of the stalk. In the mountains no hay is cut when seed is produced. In the big valleys the third crop is allowed to go to seed. When a crop of seed is produced one or more crops of hay are sacrificed. The straw has some feeding value and the stockmen will pay \$4 a ton for it, when the hay is worth \$8 per ton. The yield of seed averages 500 pounds per acre. Some seasons the seed does not seem to set well. So each year the grower watches his crop carefully and if the seed does not set it is cut for hay. The price received for the seed averages 13 cents per pound. In harvesting, the crop must be handled with care to prevent shaking the seed out. A mowing machine that bunches is desirable; or else men follow the mower and set the seed-loaded alfalfa to one side in small bunches, where it is carefully loaded on wagons and hauled to the thresher. Seed production has proven to be very profitable in the sections adapted to it.

LIFE OF ALFALFA

The life of an alfalfa field varies greatly according to the care and soil conditions. It is safe to say that the life of an alfalfa field in this State would be from ten to fifteen years if it receives the proper care. Alfalfa, unlike other crops, enriches the soil instead of depleting it. It has the characteristic prop-

erty of legumes of being able to extract nitrogen from the atmosphere and put it into the soil. Nitrogen is the most expensive of soil fertilizers and the one usually most needed. This property of alfalfa makes it of infinite value as a soil fertilizer, hence its popularity for rejuvenating the soil. Its deep rooting capacity permits it to reach to great depths for its plant food. Its extensive root system creates and puts new life in the soil and when the alfalfa field is plowed up these roots decay and the fertilizer is distributed through the soil. Land that has been heavily cropped one year after another, when put into alfalfa takes on new life. When grown for a few years among orchard trees and plowed under, it is a valuable fertilizer not only adding nitrogen to the soil but also improving the physical condition. Doctor Hilgard claims that the crop is worth \$8 a ton as a fertilizer to plow under.

ALFALFA AS A FEED

Digestible nutriments contained in 100 pounds of green alfalfa:

Dry matter.....	28.2	Pounds
Protein	3.6	"
Carbo-hydrates	12.1	"
Fat .....	.4	"

Digestible nutriments contained in 100 pounds of alfalfa hay:

Dry matter.....	93.2	Pounds
Protein	11.1	"
Carbo-hydrates	39.1	"
Fat	1.0	"

The above tables show the high nutritive value of alfalfa, either as a green food or as a hay. All animals like it and without doubt it is the best roughage we raise in this country. It must always be remembered that it is

only a roughage and that to obtain the best results some concentrated carbonaceous feed, such as corn or barley, must be fed in conjunction.

There is danger of bloating either cattle or sheep, when pastured on alfalfa. They should be carefully watched at first and only allowed to graze a short time until they get accustomed to it. They should never be turned in to graze when the plant is damp.

Most of the alfalfa in this State is used for dairy purposes. A good stand yielding about seven tons will furnish enough feed for one cow. It is figured that a cow will eat half a ton a month. Hogs are usually run in connection with a dairy; the skim milk combined with some grain and alfalfa makes an ideal ration for hogs.

It is too laxative to be fed in large quantities to horses doing road work, but for work horses and brood mares it is of great value. It is an excellent feed for any kind of growing stock because of its high protein content, which forms the bone and muscle. Bees make excellent honey from it and it is unsurpassed as a green feed for poultry. Sometimes it is ground into meal to make it more palatable for some kinds of stock, such as hogs. Alfalfa meal combined with beet molasses makes a very desirable concentrate. Some alfalfa is used for silage purposes, but the most advantageous way is to feed alfalfa hay and supplement it with corn silage.

At the present time there are about 600,000 acres planted to alfalfa in this State, yielding close to 2,100,000 tons of hay, or an average of three and one-half tons to the acre.

“TAKING a hasty backward glance over the whole stretch of gardens, orchards and plowed fields, let us rest the eye a moment on the alfalfa lands which show their green miles in every corner of the State. After three or four crops are cut in succession in a single season, the happy hogs are turned upon the land for a few months—turned into the paradise of the pigs.

“But lest you should think that alfalfa growing is all ‘velvet,’ please note the plaint of a certain grower. ‘I was told by everybody,’ says the discouraged farmer, ‘that after I had done the planting and got the water going, I would have it easy. But this is not so: I have got it planted and I’ve got the water. Yet it keeps me jumping all the time to keep the alfalfa cut.’”—Edwin Markham, in “California the Wonderful.”

"The Farmer on the Job!"

In a recent letter to the salesmen of his company, E. C. Simmons, president of the Simmons Hardware Company of Saint Louis, is reported to have written as follows:

"Don't worry. War or no war, freight-rates or no freight-rates, tariff or no tariff, baseball or no baseball, grape juice or champagne,—the farmer is still on the job."

There is a world of significance in that statement, which the undiscerning might regard as humorous. The farmer is on the job! Never forget that. He it is who must heal the scars of war, whose peaceful occupation means the saving of the nations.

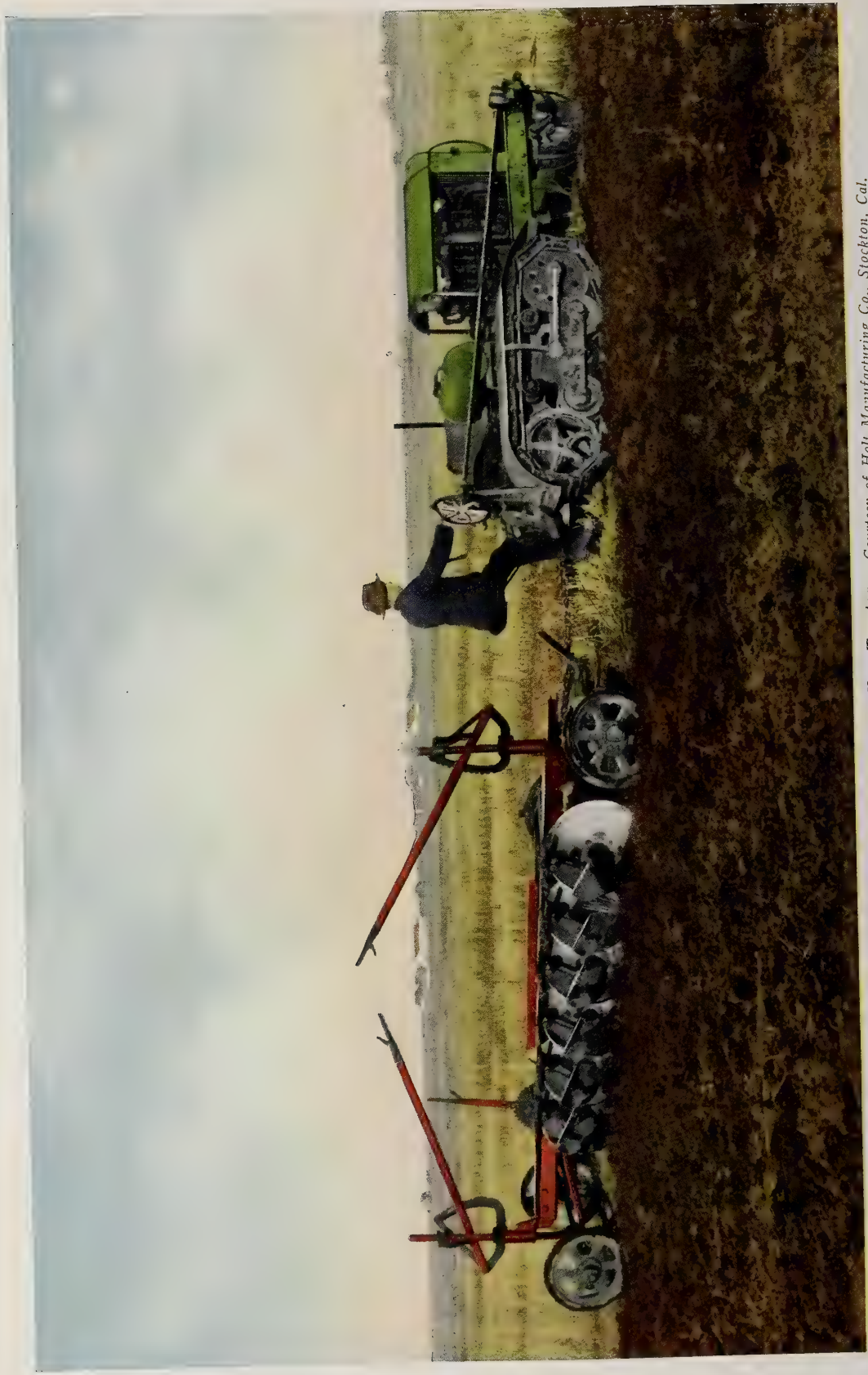
CALIFORNIA FARMING

Differs from farming in most other localities. For instance, it is a lot easier, though no man may expect to sit down and wait for things to grow without applying the needed labor. As Dean Hunt, of the University of California, says in his article in this number of CALIFORNIA'S MAGAZINE, "it takes more than a wish to become a successful farmer in California." But no man with red blood in his veins would be happy in a land where there was nothing to do but eat and sleep and grow plethoric and lazy. The point to consider about California farming is that it is carried on under excellent conditions, with a minimum of difficulties, under ordinary circumstances and a maximum of production. And in California, the farmer is always on the job—in more ways than one. Not only is he a successful farmer, but he is also up to the minute in most other things. He reads and he believes in education. He rears his children to become successful men and women, and there is no youth of the present day who is not proud to say that his father is or was engaged in farming in California.

FIGURES TELL

IN this issue of CALIFORNIA'S MAGAZINE are figures showing just what this State is producing in many lines and furnished by the producers themselves. They tell the tale. And there are openings in plenty for all who come. This State can stand ten times its present population and still be a comfortable place to live in. The man who comes to California to engage in farming or, indeed, any useful occupation must come shod with confidence and with the germs of success in him; he must be alive to opportunity's knock, awake to the possibilities all about him. To such men (and women) CALIFORNIA'S MAGAZINE offers the aid of its READERS' SERVICE to supply information or arrange for the realization of their ambitions which point *Westward*.

READERS' SERVICE, CALIFORNIA'S MAGAZINE
New Call Building, San Francisco



Breaking the Delta, San Joaquin Valley, with Caterpillar Tractor. — Courtesy of Holt Manufacturing Co., Stockton, Cal.

California's Leadership *in* Alfalfa

By E. J. Wickson

(Editorial)

CALIFORNIA has two main points of interest in the wonderful advancement of alfalfa as a forage plant for North America during the last half-century:

First, the relation of alfalfa to the agricultural development of California.

Second, the importance of California's gift of alfalfa in the development of animal industries throughout the North American continent.

WHAT ALFALFA HAS DONE FOR CALIFORNIA

Of the debt which California owes to alfalfa there is no exact measurement, because the recent progress of the plant in our agriculture simply outruns the statisticians. The records of the U. S. Census of 1910 show that in the preceding year, alfalfa was grown on 19,904 farms and the acreage of it was 484,134 acres: the product as hay and forage 1,639,707 tons valued at \$13,088,530. Since that date we have had four full growing seasons—during which settlement, irrigation extension and sub-division of farming lands have proceeded more rapidly than during any preceding decade in our history. Estimates of the advancement of alfalfa since the census report of 1909 vary between 50 to 100 per cent of increased area. It is certainly safe to estimate the standing of alfalfa as a California product in 1913 to be an acreage of three-quarters of a million acres and an annual product value of \$20,000,000 in the field where it grows either for hay or pasturage. The market value would, obviously, be much greater. This field valuation includes a consider-

able acreage of young alfalfa and is reduced thereby. A conservative estimate of the field value of the annual product of a good stand of mature alfalfa would be \$40 per acre and the continued profitable life of the plant on deep, open land, well irrigated and cared for, may extend to twenty years, though it is usually an advantage to plow up at shorter intervals, either to get the advantage of rotation, and the vastly greater product of other crops for which alfalfa prepares the land, or to replace the old plants with younger and more vigorous ones.

In California the alfalfa plant is now largely the basis of the following products of the state, as reported by the U. S. Department of Agriculture for 1912 and by the California State Dairy Bureau:

Dairy (product 1912)	\$ 32,160,078
Live stock (on farms)	123,024,653
Poultry (on farms)	3,844,526
Eggs (product 1909)	10,263,694
Honey (product 1912)	739,793

It may seem strange at first to credit eggs and honey to alfalfa, but things are rapidly moving that way. The egg product in the alfalfa growing districts is increasing rapidly and even in the coast regions where alfalfa is little grown, alfalfa hay and alfalfa meal enter largely into poultry rations. As for honey, which was formerly made on wild bee-pasturage, the chief products come now from the alfalfa fields of the irrigated valleys.

Without undertaking to elaborate the theme to weariness it may be briefly and confidently declared:

First: that no single plant whatever (either herb, vine or tree) is producing so great value in California as the alfalfa plant.

Second: that no single plant comes so quickly to the home-maker's help on irrigated land or on suitable land under rainfall, than alfalfa and none assumes so many forms of value.

Third: that no plant, save a vine or tree, endures so long in profitable service.

Fourth: that no plant is so good to fit land for every other crop known to the State.

WHAT CALIFORNIA HAS DONE FOR NORTH AMERICA IN ALFALFA

Now that the interest in alfalfa covers the United States and the plant is either established or undergoing trial nearly everywhere from the Gulf of Mexico to the Canadas, it is pertinent to point out not only California's leadership in the utilization of the plant, but the effect which California's demonstration has exerted everywhere.

About sixty years ago gold seekers were coming to California by all available routes and food supplies were ordered from all the markets of the world. Either through the travel for gold or the trade for food, there came to California knowledge of a strong growing, perennial clover in Chile which was new to American eyes, and though California was not then generally recognized as wonderfully endowed for agriculture, there were a few pioneers who saw the truth and made haste to take advantage of it. What seemed to them little less than a calamity was that the rich fields, which grew grass so tall in the rainy season that riders on horseback and grizzly bears could not see each other until actually encountered, should be bare of verdure during the long summer and autumn heat which the grand valley oaks and sycamores showed to be so good for foliage. If there could be found anywhere a plant which would not bleach and die in the early summer, when

plants should be doing their best growing, surely the California plains could out-farm any country where grass started in April and browned in September. Was this wonderful clover in Chile such a plant? Perhaps; we will try it.

What was that patch of green in the Sacramento Valley just below Marysville in 1853? Surely someone had been pouring water on it from a well or from the river. No? Well, it surely is a wonder; worth riding miles to see. And they rode miles to see a little green island in the midst of an ocean of midsummer yellows and browns: verdure without irrigation: a plant which could pump its own water from the permanent supply when it occurs twelve or fifteen feet below the surface of a soil freely open to root-penetration. The plant for which the pioneers pined had been quickly found! It is possible to transform the sere summer aspect of the plains into park-like expanses of verdure! Though the plant on suitable soils will do this by its own powers, its service could be multiplied by irrigation and extended also to soils on which it could not help itself to moisture. The crowning need of the whole arid region, west of the Rocky Mountains, had been supplied through the optimism and enterprise of a few California pioneers!

The Mormons at Salt Lake were pioneers in irrigation on the Pacific Slope, but they had no alfalfa until they saw the California demonstration and profited by it. Then alfalfa followed irrigation water in Colorado, Idaho, Montana, Wyoming, Nevada, Arizona and New Mexico—not in the order named, perhaps, but all of them following California and Utah. Then came the movement eastward from the Rocky Mountains; Kansas and Nebraska first and then the whole sweep of the Mississippi Valley, then to the Atlantic Slope from New England to Georgia. Everywhere the impulse to try alfalfa came from what people east of the Sierra

Nevada had actually seen, or heard about, as done in California. In many cases, no doubt, eastward-moving Californians personally pioneered the alfalfa movement in distant states. I remember that the demonstrations in Nebraska and Virginia were first made by ex-Californians.

A STRIKING EVENT

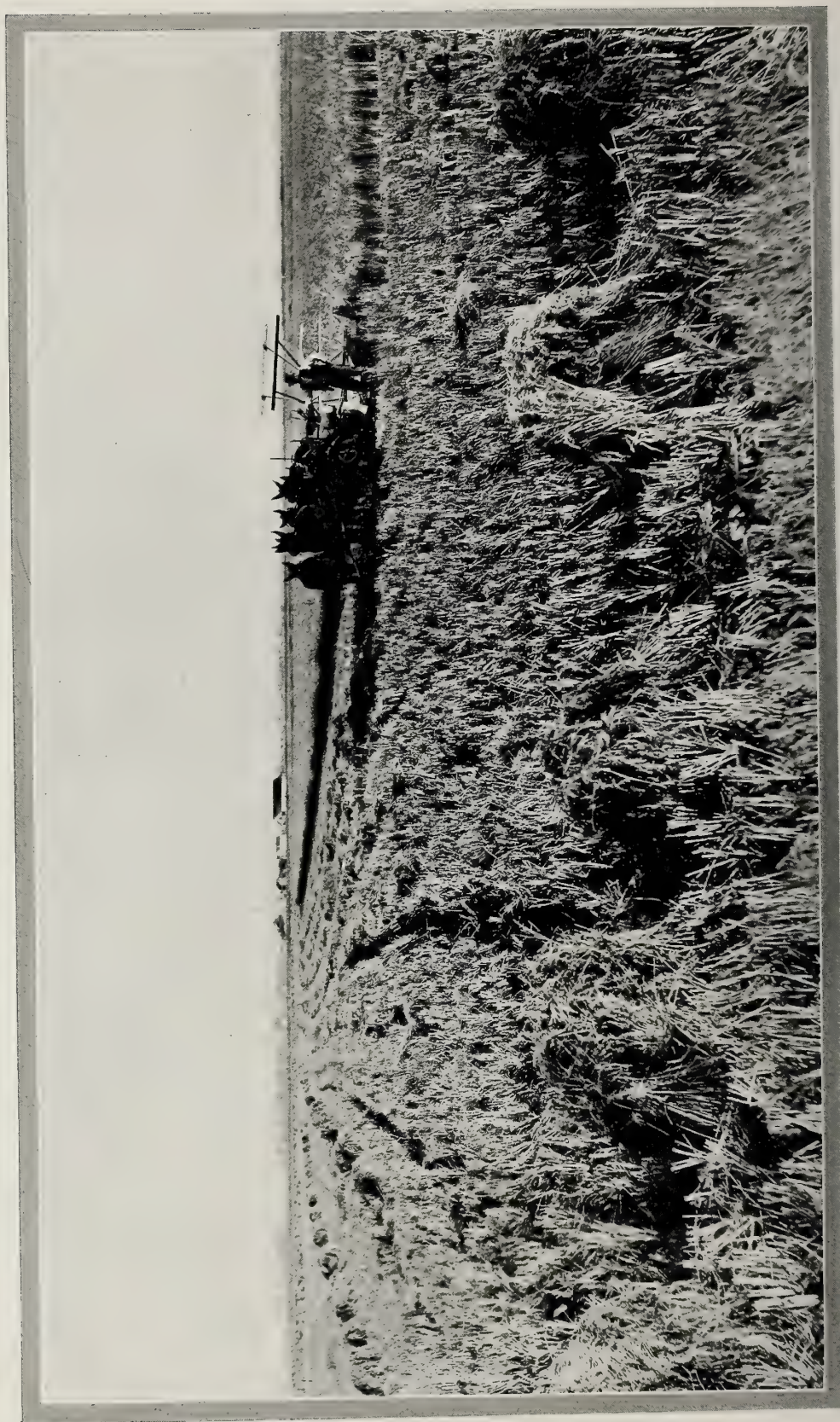
It is apparently a striking event in plant movement this progress of alfalfa eastward across the United States. The course of economic plants beginning in pre-historic times has been westward—not only from the traditional birthplace of the race in Asia Minor as commonly recorded, but from China westward into India and thence westward in the movement of the Aryan races. And yet, stemming this tide, alfalfa moved eastward from California. A few other things have done this in the past and many others will do in the future as there is realized in California the center of a new and unique American civilization, of which the potentiality is now discernible; a Pacific-American type of thought and action, of which the foundations were laid when the whole world came to California seeking gold in 1849.

And while all this is true, it is of course a fact that the plant known in Europe as "lucerne" reached the Atlantic Coast many times, no doubt, prior to the introduction of Chile "alfalfa" at San Francisco. The names apply to the same plant, but "lucerne" made no appreciable stand on the Atlantic Coast nor did it move westward therefrom. It rested under condemnation for inferiority to red, white and other clovers. In 1871 this writer was secretary of the Central New York Farmers' Club, of which Mr. Campbell, owner of the New York Mills herd of Shorthorns, was president, and at a meeting of the club someone asked Mr.

Campbell what he thought of the plant "lucerne" which had recently been received from Europe. "I am going to plow it up," said Mr. Campbell; "it is not as good as red clover." Mr. Campbell could grow a shorthorn cow which sold at auction for \$40,600, but he could not see value in alfalfa. This was evidently the conclusion of others, for the plant as introduced at Atlantic parts never established itself. It was not until the same plant proceeded eastward, clad in the panoply of its western victories, that it could command intelligent trial and fair judgment. Now it is engrossing attention everywhere, even in the states where the last generation condemned it as undesirable.

Alfalfa made its first enduring stand on American soil in California and the California demonstration of its value lies in the foundation of the present popularity of the plant because of its usefulness in stock growing and feeding enterprises in all parts of the United States. In the middle of the last century California gave the world more gold than it previously possessed, but it made a greater contribution to American development in the gift of alfalfa, because alfalfa will grow each year in volume value and potentiality throughout the continent.

But though California experience has thus aroused the present interest in alfalfa on this continent and though great value will be derived from the plant here and there, its public service will, in the nature of things, be greater in California than elsewhere. California cannot distribute her deep free soils nor her amplitude of heat nor her freedom from frost which insure eight months in the year of alfalfa growing and hay making. To reach the fullest benefits of the plant the California climate is indispensable.



Harvesting Rice in Yuba County, California

The California Rice Industry

By Theodore Goodman

General Manager of California Rice Growers' Association

Editor's Note: Mr. Goodman's article on rice growing in California is an interesting sketch of California's latest agricultural specialty by a representative authority; it is historical of the way the enterprises now flourishing came about; descriptive of the land and water conditions required, and demonstrative of the fact that they exist in this State as shown by the wonderful increase in production, etc. Mr. Goodman discusses also the outlook for rice in State development.

AN EXPERIMENT yesterday, an actuality today—this spells the history of the rice industry in California. It is true, however, that what is termed an experiment in this State would elsewhere probably be considered anything but that, inasmuch as California's achievements are always characterized by their magnitude. However that may be, rice culture here has outgrown the experimental stage; no longer is it dependent upon the labors of experts, or even the co-operation of the United States government, which has so materially helped the work heretofore. Rice men have abandoned their swaddling clothes, so to speak, and have demonstrated that the culture in California of the greatest cereal is not only practical but destined to take a place in the foreground of the agricultural activities of the State.

An idea of the rapidity of the growth of the industry is perhaps best gained through the following figures which may be termed fairly authentic. In 1908 the crop was negligible as was the acreage. This season's rice crop in California amounts to 50,000,000 pounds, acreage, 15,000. Experts estimate that the next crop will produce double the amount and that a corresponding increase in acreage will be noted. The average price of rice is two cents per pound, thus the crop may be

said to have had a total value of \$1,000,000. Which is not so bad for an industry that is to all intents and purposes but three seasons old. This does not mean, however, that no experimenting had been done in rice culture prior to that time; indeed, experiments are noted as far back as 1860, when the total product was but a trifle more than 2000 pounds. Following that little was done with rice in California until, in 1894, efforts were made to test the availability of the peat lands on Union Island with Honduras rice. These experiments were provided for by congressional appropriation to the United States Department of Agriculture obtained by Honorable A. Caminetti, then a member of Congress, and directed by Doctor H. W. Wiley in connection with sugar beet investigations, Professor E. J. Wickson being in charge as "special agent." The growth was rank, but failed to head. This was attributed to either lateness in planting, the character of the grain, or both causes, but the experiments were not then repeated. Practically the first crop of importance was produced about six years ago west of Biggs, Butte County, by William Grant.

GREATEST CEREAL

It may not be commonly known, but is no less a fact, that rice forms the most important cereal and is more widely used than either

wheat or corn. No matter how great may become the yield of rice in this State it can not affect the price of the commodity, owing to the great and ever-increasing demand.

If there is one thing more than another which concerns the success of the rice industry it is water. Irrigation is essential, since rice requires to develop a successful crop a great deal of water; indeed, the plants must stand in water constantly for from ninety to 110 days. Thus far practically all the rice grown here has been produced upon land not previously irrigated. The continued development of the industry, then, depends largely upon the future extension of the facilities for bringing water to the land. That this enlargement and extension will come to pass is undoubted, since the industry has been proven profitable and has opened up for use lands that had either been unused or abandoned, owing to years of constant farming which had robbed the soil of so much of the available plant food.

A striking fact in connection with the culture of rice in California is that in quality the yield has been superior—almost if not quite, equal to the Japanese in flavor and in cooking quality. The richness of the soil has been given credit for much of this. Rice was shipped from California to Boston and New York this season and brought good prices.

The advent of rice in this State may be said to have marked the triumph of "adobe"—the soil identified with California in song and story, since it formed the principal ingredient in the materials used for construction of the early missions and other buildings which are famous as landmarks of the early days, the days of pioneers. Adobe, or 'dobe, as it is commonly abbreviated, has proved itself splendidly adapted to the growth of rice and as there are several hundred thousand acres of it in the Sacramento Valley, this is in itself an important factor. The 'dobe soil is close, compact and when wet is tenacious and putty-like. It is underlain at a depth of approximately three feet by a sub-soil that is practically impervious to water and this is highly important, since it prevents the loss of water

by percolation downward. It may be mentioned, however, that rotation crops will have to be developed as the same land will not go on producing rice year after year. This problem will not be difficult of solution, according to experts.

There have been difficulties in the way of rice culture here; like every good thing, it has not been attained without effort. Delays in planting or in bringing the all-essential water, lack of machinery for rapid harvesting when the planting had been late, weed pests, etc., may be noted as the principal stumbling blocks. None of these, however, has proven insurmountable. This year's seeding was begun earlier and machinery is arriving by carloads.

The weed pest has not been a serious drawback; water grass (*panicum crus galli*), known commonly as "wild millet," has been the chief offender and must be pulled out of the rice fields by hand. The cost of keeping the fields free has been estimated not to exceed \$2 per acre. Red rice, another dangerous pest, has not yet made its appearance here, and extraordinary care is taken not to introduce it through mixed seed.

Though many varieties of rice exist, and numerous kinds have been experimented with here, the Wataribune, a Japanese variety, has proved most successful. Experiments are under way now with other varieties that mature more quickly, a desirable feature that will enhance the industry materially.

SURPRISING YIELD

The yield in California has been little short of surprising; for example, the rice fields of Louisiana yield from 1200 to 2500 pounds per acre per year, the average being about 1500 pounds. In the Sacramento Valley the lowest yield reported where there was any pretense to successful crops, was 2000 pounds per acre, while maximum yields are reported to have reached 8000 pounds per acre. But while, heretofore, the rice production has practically been confined to the Sacramento Valley, Butte and Colusa counties standing pre-eminently, it must not be imagined that the cultivation

of the cereal is restricted to those districts. Indeed, it has been shown that other districts and other varieties of soil besides 'dobe are suitable for rice growing and the Southern counties have begun planting. Clayey soil, level stretches and water, water, water—the one great essential—will insure good rice crops; other things, such as practical knowledge of the planting, or seeding, preparation of the land prior to seeding, leveling, checking, etc., being equal.

Harvesting is a feature of the culture of rice that needs study. This is done with a self-binder; the grain is shocked in the field and threshed with an ordinary grain-thresher after it has been well cured in the shock.

April is generally considered the best month for planting and this process differs little from the planting of wheat or barley. After the land has been well prepared seeding is done with a grain drill or broadcasted at the rate of eighty to one hundred pounds of rice per acre. Rice when seeded in April and handled properly should mature during the first part of October. Good drainage of the land is important: As soon as the rice is seeded germination should begin. If the ground lacks the necessary moisture and there are no spring rains, it is necessary to flood. After flooding, the checks must be drained rapidly. After the plants have been well tillered, the land must be kept submerged continuously until the rice begins to ripen.

The by-products of rice culture are considerable; of these bran is perhaps the most important, besides which are: polish, broken or brewer's rice and hulls. There are six rice mills now in the State and more will spring up continually as the demand increases through the increased production, for mills are an essential, since rice must be polished before it has a marketable value, for table use.

An estimate from the owner of one of the finest rice fields in Butte County district as to the actual costs incurred by him, and which

may be taken as fairly representative, shows the cost of preparing land and growing the crop to have been \$21.55. The cost of harvesting, threshing and hauling, based on thirty-five sacks per acre (3500 pounds), \$15.75. Total for growing, harvesting and marketing a crop of rice, \$37.10. Product in good condition brings an average price of \$2 per hundred pounds. Thus, figuring conservatively, a thirty-five-sack crop will yield the farmer a net profit of \$32.90 per acre.

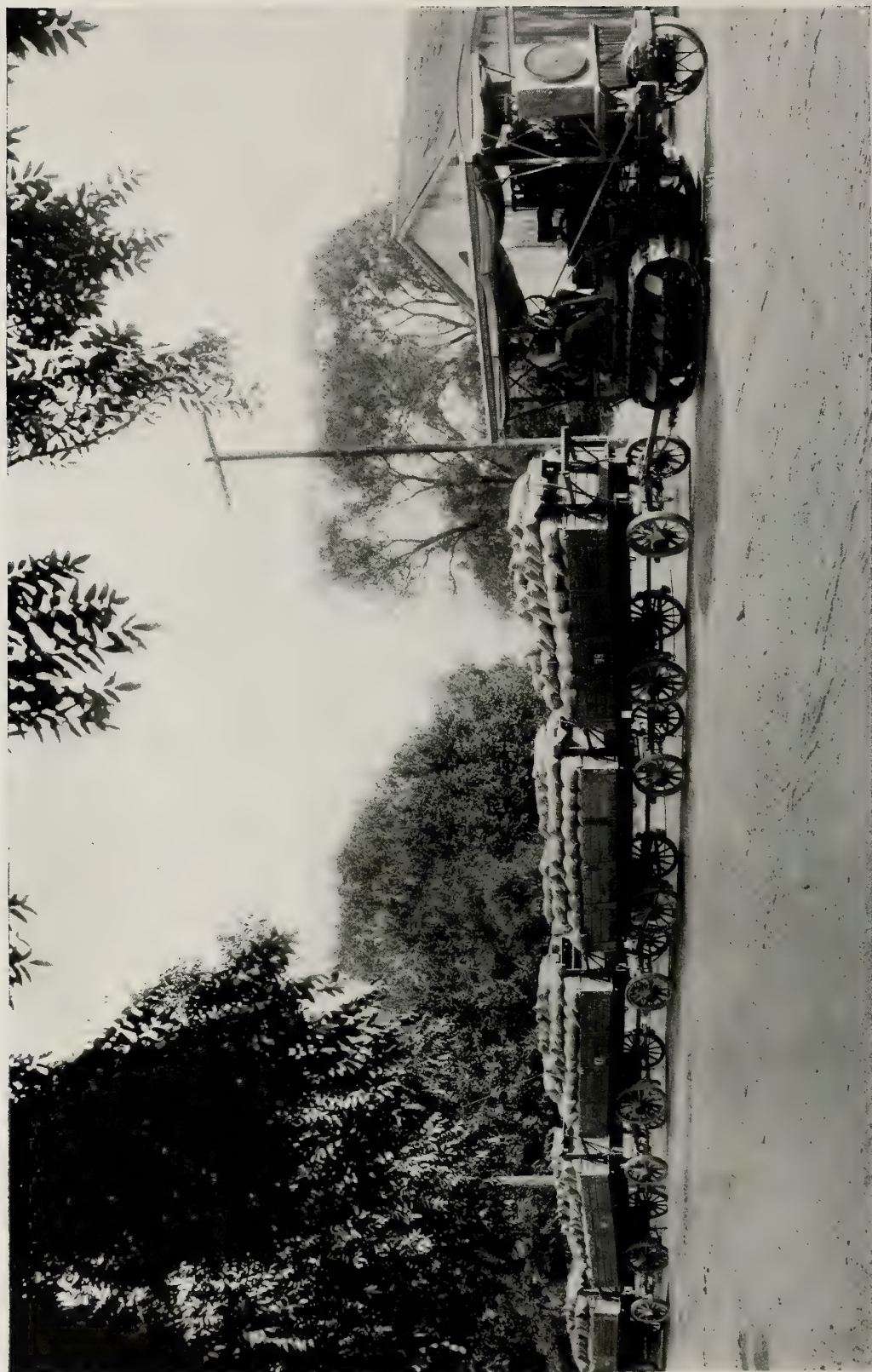
The market for rice is assured at all times, owing to the importance of the cereal in the world markets, as already intimated. So vast is the world crop that any quantity produced in California can not affect the price. There is no likelihood of over-production.

RICE HAS COME TO STAY

Pages might be written of the possibilities of this industry in the future development of the State, but it is enough to say that rice has come to stay as one of the staple products of California. Much could be told of the influx of foreign buyers, investors and others; of the demand for and consequent impetus in the manufacture of machinery for harvesting and milling rice; of the increase in land values and the opportunities presented to those who contemplate making their livelihood from the soil.

In this brief résumé of the situation only a tithe has been told, where a book could be written, but enough has been said to prove beyond the shadow of a doubt that, in the culture of rice, California has again demonstrated that as a State she is equal to any emergency, that even the Orient can not boast of greater richness of soil or more benign climatic conditions, for has not California taken a prominent place in the production of a cereal long identified with Cathay and Nippon?

To sum up, it may be said that California, as a rice producing center, has proved itself—the future of the industry depends upon the man—and not the State.



Hauling wheat to the mill with Caterpillar tractor.—*Courtesy Holt Manufacturing Co., Stockton*

The Milling Industry of California

By Hon. Horace Davis

Editor's Note: Mr. Davis is one of the best known citizens of California, having been a pioneer in the milling industry of the State and having added to commercial and manufacturing activity during his long career the duties of a member of Congress, the presidencies of the San Francisco Produce Exchange, the University of California, the board of trustees of Stanford University, etc. His career is a striking demonstration of the efficiency of the college man in industrial and commercial and in public affairs. He writes of the milling industry of the State as one only can write of a thing of which his life has been a part, and the sketch which we publish will be accepted by all future historians of the State as a basis for their studies.

THE milling industry of California really begins about 1854. Under the Spanish regime, prior to the American occupation, some wheat was raised and some little flour was made in a crude, primitive way, but the amount was insignificant, and the business came to an end in 1848, when the "gold fever" drew to the mines the whole working population of the Coast. And for a few years we lived on imported breadstuffs.

In the year from July, 1853, to June, 1854, we imported 450,000 barrels of flour, but that was practically the end of this wasteful process. The laborers returned to the farms; little mills sprang up at the wheat centers and the next year, 1855-56, we were sending flour to every part of the Pacific Ocean; in small quantities, to be sure, but the tide had turned, and California had become a producer of breadstuffs. Six years from that time, in 1860-

61, we exported 1,500,000 centals of wheat and 200,000 barrels of flour.

The production of wheat increased quite steadily for a period of thirty years, stimulated by good prices in Europe, extension of railroads into the interior valleys and a steady growth of population, till in 1880 we reached the maximum in a wheat crop of 32,537,360 centals.

Meantime the flour mills had increased in number and capacity; the foreign demand was large and the number of mouths to feed at home was increasing every year. The export of flour reached high water mark about the same time as the wheat crop, say 1883-85, after which it slowly fell off. The main causes of this decline were the gradual shrinkage of the shipments to England and the entrance of Oregon and Washington into the Asiatic trade. With the completion of transcontinental railways to the Pacific Northwest,

direct steamers were put on from Columbia River and the Sound to Hongkong, and Oregon flour being cheaper largely displaced ours in the Asiatic markets.

But the foreign demand was not the only factor in this interesting problem. The population of the State was increasing every day and must be fed. Now the millers figure that it takes a barrel of flour a year to every inhabitant, man, woman and child; in addition to this we must allow for seed, feed, distilling and waste. But the export of the State, in flour, at its maximum in 1884-85, only reached 1,304,861 barrels, while the population in 1891-92, seven years later, was estimated at 1,319,338, making the home consumption greater than the export of 1884-85, and the population was steadily increasing.

WHEAT GOES DOWN

Meantime, in the latter eighties, the price of wheat, which had been pretty well sustained up to 1885, was steadily receding to a lower level. New supplies of wheat from India and Argentina were flooding the European market, knocking down the price to a constantly lower figure, till by 1894 it had got down to 90 cents per cental in San Francisco, which was less than cost of production. The farmer bore it patiently for awhile, but ultimately he had to go out of wheat-raising and take to vines and fruit. The miller was less affected by this slump in the market, because the price of flour is regulated by the cost of wheat. But a new enemy came into the field whom he could not dislodge. The Oregon millers, not content with occupying the Asiatic market, began to pour their surplus in large quantities into California. We had been obliged to meet this competition before, but the Palouse and Walla Walla districts brought vast areas of new land into cultivation and gave a fresh impulse to the import of Northern flour into Cali-

fornia, which has steadily increased till last year it amounted to over a million of barrels.

NEW VS. OLD METHODS

While all this reorganization of the lines of trade was going on, the ruinous decline in the price of wheat, the falling off of the crops, the loss of our foreign trade, and the invasion of our home markets—while all this was going on, we were fighting out at home the battle between the old system and the new system of milling, between the mill stone and the steel roller, the adoption of the purifier, the change from revolving reels to shaking sifters—in a word, from the old, time-honored method to new, up-to-date gradual reduction, involving entire reconstruction of our mills at an enormous expense.

This radical revolution in our mechanical methods has covered a period of thirty years and is not yet entirely finished, but the main features of the changes are pretty clearly marked out and from now on it will be largely a matter of less important detail.

But while all these serious changes were going on in our business we were up against a graver change even than any we have noted. During this thirty years of struggle the wheat crop of California had run down in volume from 1,600,000 tons to an average of about 200,000 tons, not enough to supply half the annual demand for food, feed and seed inside the State. By a curious reversal, our barley crop had increased during the same period, roughly speaking, from 100,000 tons to 800,000; that helped the farmer, but was no consolation to the miller, who couldn't make flour out of barley.

So the miller had to go outside of the State for half his stock of wheat. He imported from every direction, but mainly from Oregon and Washington for ordi-

nary stock and from Kansas for superior glutinous quality; and at once we were up against an entirely new trouble. While we used home-grown wheat that we were familiar with we knew just what it would make, but when we came to handle foreign stock we were in the dark as to its composition. So we had recourse to chemical analysis, to the laboratory to tell us how to mix these strange wheats, and by these means we conquered the situation. Today the California miller analyzes all his wheats in his laboratory and blends them under the direction of his chemical expert. This radical change in the method of mixing wheats has been going on for ten years, and must be the rule of the future, for under the instruction of the practical chemist and baker we have conquered this new trouble with foreign wheat and are making better flour than ever. In one word, we have dropped the old rule-of-thumb practice and are working under new, up-to-date, scientific methods.

HOW THE MILLER WON OUT

This story of the battle of the last thirty-five years has been very interesting to me. One by one the obstacles met by the miller have been overcome. Some of them were serious, some seemed almost fatal to the industry, but they have been met and surmounted by patience, perseverance and energy till today the milling interest seems to be on as secure a foundation as any of the California industries. We have the home market and Arizona, and across the sea we retain considerable trade in Asia, in the Pacific Islands and in Central and South America. Our flours are higher in quality and our methods of milling are more economical than ever before. One reform remains to be accomplished. We must dispense with wheat sacks and prepare to handle the grain in bulk. Till we do this the Pacific millers cannot compete in economy with their

brethren east of the Rockies. It was attempted many years ago, but did not succeed. Recently the idea has been revived at the north with considerable success, and the millers of California must follow this example if they hope to compete with their Eastern brothers in any of the Atlantic markets.

And now, in conclusion, what are the prospects of the future? We have met and overcome the problems of the past, the present is bright and full of encouragement. What hope does the future hold out for us? It lies mainly in the Panama Canal, which brings us many thousands of miles nearer to the great world markets on both sides of the Atlantic Ocean. On the one hand armies of immigrants from Europe will pour through the Canal to fill up our sparsely occupied territory; each one of whom must be fed on California products—and on the other hand it shortens the distance, lessens the time, and cheapens the freight on all our commodities to the great mass of consumers on both shores of the Atlantic. We shall have a fighting chance at the Gulf ports, the South Atlantic States, and even New England, and we may reasonably hope for a rate of freight to Northern Europe, with its dense population, that will compete with the rates from the great milling centers of the Middle West.

It is idle to predict the future. Who would have imagined in 1880 the course of events of the last thirty-five years? We may not predict, but we may hope. And the same energy which has turned the disasters of the past into ultimate victory—that same energy will continue to animate our millers and will go a long way towards turning our hopes into fruition, and it may easily be that the opening of the Panama Canal will usher in an era of lasting prosperity for the milling industry of California.



Towering Hop Vines in a California Field

Hop Growing in California

By E. Clemons Horst

President of E. Clemons Horst & Co., San Francisco

Editor's Note: Mr. Horst, who has been for years the leading organizer of enterprises for hop production, writes a striking article on California hop growing; the extent of the industry; the distinctive character of the product and its place in the world's markets; the original things which have been done to make the crop and to command the attention of distant consumers; the enterprising plans for improved production, including the new hop picking machine, and presents many points of interest to readers, especially those who know hops and their uses.

THE hop industry ranks first as a provider of employment for unskilled labor. It offers healthful, open air employment to both old and young, irrespective of sex, and at a wage rate that yields good remuneration for the service rendered.

There is probably no other crop grown in California that takes as large an initial investment, involving as much labor and expense, and as much hazard, in the growing, harvesting, and marketing as hops.

In addition to the first cost of the land, say \$250 to \$400 per acre and permanent improvements, which improvements alone cost from \$160 to \$250 per acre according to their stability, the annual expense of growing and harvesting a hop crop often runs as high as \$300 per acre.

Of this amount close to two-thirds is labor. The hop growers of this State, with its 9200 odd acres of hops, pay out annually about \$2,000,000 for labor and another \$1,000,000 for supplies, such as stringing twine, hop cloth, hay and feed, spray material, fertilizer, and all sorts of accessories to keep implements, etc., in repair. Of this last \$1,000,000 annual expenditure nearly all would again resolve itself into labor expense, if completely analyzed,

so it is safe to state that practically no other agricultural industry puts as much money in circulation among the working classes, per acre of land under cultivation, as does hops.

The hop root cuttings planted in California in early days were shipped to the Pacific Coast from Europe and from New York State. The earliest arrivals were planted in the Sacramento Valley, which still is the center of the industry—hop yards being fairly well scattered along the Sacramento River from Tehama County south through Butte, Yuba, Placer, Sutter, Sacramento and Yolo counties, as well as along other rivers in these various counties, the principal other valley sections being located on Bear, Feather, Cosumnes and American rivers.

The Sacramento Valley still grows those of the Pacific Coast hops that are the closest match for the European and New York State hops. The hop expert can correctly pick many of the Sacramento Valley hops from the genuine New York State hops. It will require only a difference in the methods of drying and pressing and the elimination of the male-hop root, so as to stunt the hop, in order to make many of the hops now grown in the Sacramento Valley, indistinguishable from the best



Hauling Hops at Wheatland

European hops. Since the industry has been established, hop growers and others either directly or indirectly interested, have worked on various improvements to increase the quantity of hops grown per acre, and at the same time to lessen the expense of growing the crop. Assistance from the United States Department of Agriculture has also been given in the improvement of quality and quantity by scientific application of fertilizers and selection of best producing types of hop plants.

IMPROVEMENTS MADE

Both short and long pole yards, where one pole was used to each hill of hops, have about disappeared, and are giving way to wire trellis eighteen to twenty feet high. This improvement increases the cost per acre very materially, but the annual saving in cultivating expense and cost of stringing and training the vines up to the trellis wire and resultant increase yield per acre more than justify the expense as the improvements will last for years and are considered permanent improvements.

Methods of cultivation have also been materially changed, ever with the idea of cutting down the hand work, but at the same time increasing the yield by the use of better implements and intensified cultivation, and in later years, this has been supplemented by consistent and scientific fertilizing and regular yearly irrigation with most excellent results.

Plowing and cultivation by tractors has already commenced and will soon, no doubt, be quite general on the larger yards at least.

Harvest labor at picking time has always

been more or less scarce in California, and was probably most acute in seasons 1905, 1906, and 1907. New York and other hop sections have also had their difficulties at harvest time, and many hop growers, and others interested in hop growing, have for years worked on a machine-process for picking hops, in fact the earliest hop picking machine patents were applied for in United States patent office over fifty years ago and new applications have been made yearly since, until the year 1908 when there were considerably over 100 patents on hop-picking machines and appliances; however, none of these earlier inventions were practical.

The scarcity of harvest labor in 1905, 1906 and 1907 was responsible for further experiments looking toward the invention of a machine that would successfully pick hops on a commercial basis. These experiments were carried on by E. Clemons Horst Co., which has perfected a machine that will pick hops quicker, more cheaply and cleanly than the work is done by hand. All modern hop ranchers are now equipped with these hop-picking machines and, as the large growers can not continue extensive operations without some reasonable assurance that they will be able to pick their crops at harvesting time, it is safe to predict that the hop-picking machine is here to stay.

The E. Clemons Horst Co. required close to 8000 hand pickers to harvest their own California, Oregon and British crops, and had they not developed hop-picking machines to



Unloading blossoms of the hop vines

their present high standard of efficiency, harvesting all the hops grown, especially those in California, would be extremely uncertain. The large number of pickers this one firm would require would affect any other grower in the respective hop sections.

One hop-picking machine running ten hours per day will easily harvest 1200 to 1500 bales of hops in one picking season, with a crew of forty men; if run twenty hours per day, will handle double this quantity in one season. One machine, running days only, with a crew of forty men, takes the place of a field crew of 225 to 250 hand pickers, or, if run twenty hours with two shifts of forty men each, takes the place of 450 to 500 pickers. With the latest improvements, machine picking is much cleaner than hand picking and should the crop mature unevenly or faster than expected, running machines overtime saves large losses from this source. The hop vines are cut in the field and hauled to the machines so that the respective spots can be treated according to their condition. All leaves, picked vines, arms, etc., are cut into fertilizer by special cutters, as soon as hops are picked from them.

METHODS OF WORK

In explanation of the working of the hop-picking machine, it may be said that the hop vines are first cut off about twenty-four inches from the ground, then hauled from the field to the machine picking plant, and there fed into machines by attaching the cut end to a vine grasper. These vine graspers travel the whole distance through the machine, the vine being



Hop elevators—from kilns to cooling rooms

drawn over and between a double set of picking drums revolving in the opposite direction to the traveling vine. These drums are equipped with V-shaped wire fingers so constructed that the hop vine, in passing over the picking drum, lodges hops in the V-shaped fingers, and here the actual picking of the hops commences. After making one round trip through the machine, the vine is discharged cleaner picked than if the work had been done by hand. Each machine is equipped with sufficient number of vine graspers to accommodate sixteen vines continuously and will pick twenty-eight vines per minute. Less than one-half minute is consumed in picking each vine. Theoretical capacity of each machine is 120,000 pounds green hops per ten-hour day, actual working capacity about 50,000 pounds, thereby displacing from 450 to 500 hand pickers.

The picked hops are delivered to driers by a rubber belt conveyor so there is the minimum handling and practically no waste or delay in starting the curing process.

Extensive improvements in the curing of hops have also been made through the invention of air-driers by which a large volume of moderately tempered air is forced through the freshly picked hops by means of enormous blowers or fans. This new method of curing permits of the hops being cured at a low, even temperature from 40 degrees to 60 degrees lower than the temperature employed in the old style stove kilns. This method of curing preserves the maximum brewing qualities in



A California Hop field

the dried hops. Other important improvements made, and in general use, are kiln-loading and unloading elevators, by means of belts or chains, and the electric hop-baling press.

Owing to the large yards under cultivation in California, the development of better and faster processes has been favored and because the California climate is ideal for hop growing, there being practically no serious hop pests to damage quality, the industry should have an excellent future in the State.

The quality of hops produced in California is equal to any grown, though there is as yet a prejudice in favor of European hops in the minds of certain American brewers, but the United States government experts of the Department of Agriculture are fast dispelling the idea that geographical origin has anything to do with quality, and with proper handling Pacific Coast hops, and especially those of California, should command the markets of the world.

HERE are a few of the notable accomplishments of California in 1914-1915:

Immediately took advantage of the completion of the Panama Canal and began to reap the benefits of the improved maritime transportation facilities.

Completed the two greatest world's fairs ever held and opened their gates to the world.

Gathered and marketed a fine crop of oranges and lemons at nearly \$50,000,000 for the whole State.

Produced gold to the value of \$21,000,000, a gain of \$500,000 over the 1913 production and beating the year '49 by more than two to one. The 1914 production of gold was the largest since 1883.

Produced 105,000,000 barrels of oil worth over \$50,000,000, a gain of over 5,000,000 barrels over 1913. California is far in the lead of all other States in oil production.

Increased its financial and banking strength. The establishing of a Federal reserve bank paved the way for the release for development purposes of \$50,000,000 held in reserve by the banks of the district served by the new institution.

Expended \$20,000,000 on highways and made tremendous progress in the building of a magnificent system of paved roads that will soon cover all the State like a network.

Hay in California

By F. A. Somers

President Somers & Co. of San Francisco

Editor's Note: Mr. Somers shows how it comes about that, aside from alfalfa, California makes hay from entirely different plants from those used for hay under conditions which favor the production of exceptionally good appearance and high nutritive quality. He explains why this is the case and why, also, when it comes to alfalfa hay, California gets several times the weight to an acre in a year that can be had in humid climates. Mr. Somers anticipates that by means of the Panama Canal California will ship vast quantities of hay to the Atlantic seaboard, both of America and Europe.

HAY is rather a dry subject to the average citizen, and in California, hay *is* dry, chemically speaking, for the product of this State contains a minimum percentage of moisture, and thereby hangs a tale.

It is not generally realized that among the great fertile states of the Union, California stands rather alone and unique in enjoying rainless summers. From the late spring showers in May until the equinoctial disturbances of late September, it is very rarely that any rain falls in the great valleys of California, with the consequence that we are enabled to harvest crops with facility and ease, and of a type that is sound and sweet.

Owing to our warm climate, it has been found that grain hay, rather than timothy, rye or prairie hay, can be grown here to the best advantage. Consequently, barley, oats and wheat are sown in large quantities each season, in many instances with the determination of harvesting hay, but frequently with the idea of the grower having the option of cutting his crop early for hay or letting it mature for grain according to the condition of the crop on the market.

Occasionally, mixtures of different kinds of grain are sown and quite often the native hay

of the State, wild oat, grows naturally with the sown grain, so that we have mixtures of barley and wild oat, wheat and wild oat, and cultivated oat and wild oat. Under good natural conditions, it is possible to raise an excellent crop of wild oat hay without sowing any seed and very often crops of clean, green, fragrant, and nutritious wild oat hay are harvested at very small cost to the producer. These latter are termed volunteer crops.

When grain is sown for hay, the mowers are sent into the field when the grain is in the "milk" or in the "dough," at which stages of development the stalk or straw is full of nutritious sap and has a bright, green color. By raking, shocking and stacking the crop in proper season, a final product is developed of a beautiful appearance and which is surpassed in palatability and nutritive qualities by practically no other type of hay grown, with possibly the single exception of alfalfa.

California grain hay has long been noted among the breeders of fancy stock for its many excellent qualities, and a few years ago when all the large cities of the United States held their regular annual racing meets, many carloads of California grain hay were shipped to the racing centers, regardless of high

freight rates or ultimate costs, for it was found that nothing else could be obtained that would so well preserve an animal in good health and furnish him with strength, wind and staying qualities.

It has been estimated that California produces annually about 5,000,000 tons of hay, of which 3,500,000 tons are grain hay. More than 50 per cent of this grain hay is fed at home on the farms, but there is quite an active trade throughout the State for the remainder among the orchardists, dairy farmers, etc., and with the large cities and towns throughout California. In the larger cities, the consumption of grain hay is not increasing, owing to the general introduction of the automobile. The exportation of hay is, however, quite an important industry, large quantities being shipped annually to Mexico, the Hawaiian Islands, the Philippines, Alaska, etc.

The remaining 1,500,000 tons of the estimated crop of 5,000,000 tons, is alfalfa, and the production, general use and exportation of this particular variety is rapidly increasing in California—in fact, alfalfa is such a wonderful plant and can be produced so abundantly and cheaply here that with a constantly increasing demand, it can be safely predicted that within a comparatively short time, its production will be doubled.

By selecting a proper variety of seed, a stand of alfalfa can be developed that will produce large crops for many years without resowing. Because of the abundance of fertile land in California, our rainless summers, and our abundance of water for irrigation, the alfalfa crop of the State will average about five cuttings, and in some especially favored sections, it is not unusual to obtain as many as seven cuttings per year. In most of the other alfalfa growing states, but two or, at the outside, three crops are harvested.

Alfalfa must, of course, have an abundance of water and where irrigation is practiced the average yield of our alfalfa lands is about five tons of hay to the acre, although quite a number of our farms will produce year after year from eight to ten tons per annum. Ordinary

care and judgment enable a producer to properly cure his crop, which will show up with a bright, pea-green color, and which will preserve its color and its nutritive qualities for years if protected from the elements.

Almost every kind of animal will eat alfalfa, will relish it and thrive on it. It is fed quite freely throughout the State to beef cattle, milch cows, horses, sheep, hogs, poultry, and even to rabbits and ostriches. No general farm can be said to be successful without a field of alfalfa, and now that other portions of the United States and foreign countries are beginning to see a little of this product, it may safely be predicted that an export trade in alfalfa hay from California will shortly be developed which will prove to be one of our most important industries.

Alfalfa hay is ground into meal, there being about fifteen alfalfa meal mills in the State at the present time, and now that the Panama Canal is opened, this product is beginning to move through the Canal to the Atlantic seaboard; large cities like New York, Boston and Philadelphia having already purchased several thousand tons of this commodity since the opening of the Canal, are earnestly awaiting further supplies which will be furnished them as transportation facilities develop.

In the fall of 1914 the initial shipment of alfalfa hay and alfalfa meal was made from San Francisco to England, in which country, as well as in all the principal continental countries, much interest has been evinced in the samples of alfalfa that have been quite generally distributed there, the experienced feeders marvelling at the beautiful color, fragrance, and splendid analysis of the California product.

So, although California has a dry summer, which permits us to produce dry hay, yet it can be safely predicted that the steady growth of the hay trade of California, more particularly with reference to alfalfa, and the rapid growth of an export business in connection with same, will furnish anything but dry reading matter within the next few years.

Future of California's Cotton Industry

By John N. Blackburn

Field Representative "The California Almanac"

Editor's Note: Although cotton has been grown experimentally for nearly fifty years and although about 1870 there was a shipment of California cotton to Liverpool, and although the census report of 1880 by Professor Hilgard showed that California had exceptional natural adaptations to cotton growing, it was only a few years ago that the adverse economic conditions in the lack of available labor was overcome and commercial production established in the Imperial Valley.

SINCE Eli Whitney put together a few boards and made a machine for the ginning of cotton, there has not been so important a development in the history of the industry as the fact that the finest grades of cotton grown in the world can be produced with success in California—not merely cotton, but the best grades of long fiber, the Egyptian and Durango varieties. The former of these is the most valuable cotton grown in the world, and the latter ranks next. Several years of governmental experimentation has proved that these two valuable long fiber cottons can be grown with greater success and profit in California than in any other country in the world. For certain purposes Egyptian long fiber is mixed with American cotton to get a silkiness of finish that brings fancy prices, so that American manufacturers annually import from 50,000,000 to 75,000,000 pounds at a cost of between \$6,000,000 and \$11,000,000.

It was in 1902 when Imperial Valley still retained semblance to a desert, that a few farmers searching about for new fields of endeavor placed a few cotton plants on soil

thought to contain too much alkali to produce luxuriantly. The little plants surprised the planters who, unknowingly, became the fathers of the cotton industry in California. Since that time the acreage planted in cotton has gradually increased. Now the industry represents an investment of \$10,000,000 and an annual crop of between \$3,000,000 and \$4,000,000.

There are certain good reasons why this is the most important development in the cotton industry since the first rough pattern of the cotton gin was made. These are that the best quality of cotton grown in the world can be successfully grown in California, that the Durango long staple, surpassed only by the Egyptian variety, is acclimatized to this State, and that a greater yield per acre of these two superior qualities is grown in California than elsewhere. The average yield per acre of short staple cotton in the Southern states, where cotton has flourished for years, is approximately 60 per cent of a bale of 500 pounds, as against 78.5 per cent of a bale of Egyptian and from one and a half to two and one-half

bales per acre of the Durango variety in California.

This demonstration of the superiority of California in cotton growing is of vast importance not only to those who are now engaged in an industry still in its infancy, but to those far Eastern ports where for years the cost of transportation across the continent has been enormous. California has the advantage of being 5000 miles nearer to the most extensive cotton consuming countries in the world than the Southern states. The ports of Los Angeles, San Diego and San Francisco are in direct touch with India, China and Japan, where the national costume of all the people is made largely from the cotton fabric. The California cotton grower is assured of the top price, an unlimited market, together with low freight rates by water shipment.

The cotton exports to the Orient from various centers annually approximate \$25,000,000. With three of the best ports in the world in close proximity to these centers of trade and cheap water transportation, California has a greater future ahead of her in the growing of cotton than was ever dreamed of by the Old South.

But one thing stands in the way of rapid development of the Egyptian cotton industry in California; an economic condition, a slightly inadequate supply of labor necessary for the particular work required in growing this superior grade, and this condition is subject to elimination. But nothing stands in the way of the growing of Durango cotton, the long fiber which holds to a steady premium of ten dollars on the market. This superior fiber combines the desirable qualities of the short staple with length and strength of lint. The length of short staple lint is one and one-sixteenth of an inch; Durango, one and three-sixteenths; Egyptian, one and one-half. As high as three bales of Durango have been produced on one acre. There is absolutely no danger of low grades, say government experts, for the reason that there is very little rain to tinge or rust the cotton, nor any frost until the season is practically over. There is never

a heavy, killing frost, therefore the growing season is long.

Growers of Southern states are yearly buying more and more Imperial Valley cotton to raise the standard of quality of their product. On account of few rains, the California short staple lint is much lighter and whiter than that of the Old South and has many other advantages over the cotton from the Mississippi Valley. This fact was demonstrated in 1911 when Imperial Valley short staple took the first prize at the American Land and Irrigation Exposition at Madison Square Gardens, New York.

In 1913 Imperial Valley short staple brought a premium over the prevailing market of \$3.65 on a bale of 500 pounds. This was due to two things, the superior lint of the California cotton and the enormous quantities of low grades in the South. Even during the recent crisis in the cotton market, due to the European difficulties, California has maintained a standard above the market. This was especially true of the higher grades, such as Durango and Egyptian.

The American export cotton trade amounts annually to between six and seven hundred million dollars. California's contribution of 1913-14 amounting to more than 20,000 bales, valued at \$1,610,000, was scarcely an item in this vast export, but this beginning, coupled with the fact that in this State are hundreds of thousands of acres capable of producing a cotton which brings a premium, whether short staple, Durango or Egyptian, is all the more reason why the future of the cotton industry in California promises an achievement at which the world will marvel. It is the reason why these superior grades producing more to the acre in California than the short staple in the Old South, is of so much importance to the man or woman who contemplates reaping a fortune from the districts which have proved adaptable to cotton growing.

To the west of this cotton center is the Orient: China with its 404,000,000 inhabitants; Japan with 96,000,000 inhabitants; the Philippines, India and Australia. In these

countries California will come into competition with the growers of the Nile, but will be competent to battle for trade supremacy with capital, quality, and eventually quantity of cotton. To the east, since the opening of the Panama Canal, is a vast field of commerce in cotton.

Though established but a few years, California growers have shown that to this State belongs the lead in producing early crops. The first bale of cotton ginned in the United States in the 1914-15 season was taken from the presses at Calexico on June 17, the earliest previous record being June 20, 1908, when a bale was ginned at Brownsville, Texas.

Cotton brings from \$60 to \$75 a bale, or approximately 13 cents a pound. To this can be added about \$3.65 premium for California short staple, about \$10 premium for Durango, and from \$15 to \$20 a bale for Egyptian. The average cost per acre for cultivation of cotton is \$30. Under proper conditions, such as scientific and intensive farming, two bales of short staple can be produced on an acre. This makes a gross return of about \$150 per acre or perhaps \$120 net. In California the premiums for the kind of cotton raised should be added to the net income. The cost of producing Durango or Egyptian fiber is slightly more on account of greater care required in picking and ginning, but, as stated, the net profits are correspondingly greater.

Already, cotton growing in California has produced the following results: About eight thousand men have found employment; fourteen ginning plants of four stands each have been erected, the entire industry in the State representing a \$10,000,000 investment; two cotton seed oil mills and one cotton mill are operating; the best cotton in the world is produced, and a greater yield per acre is the result.

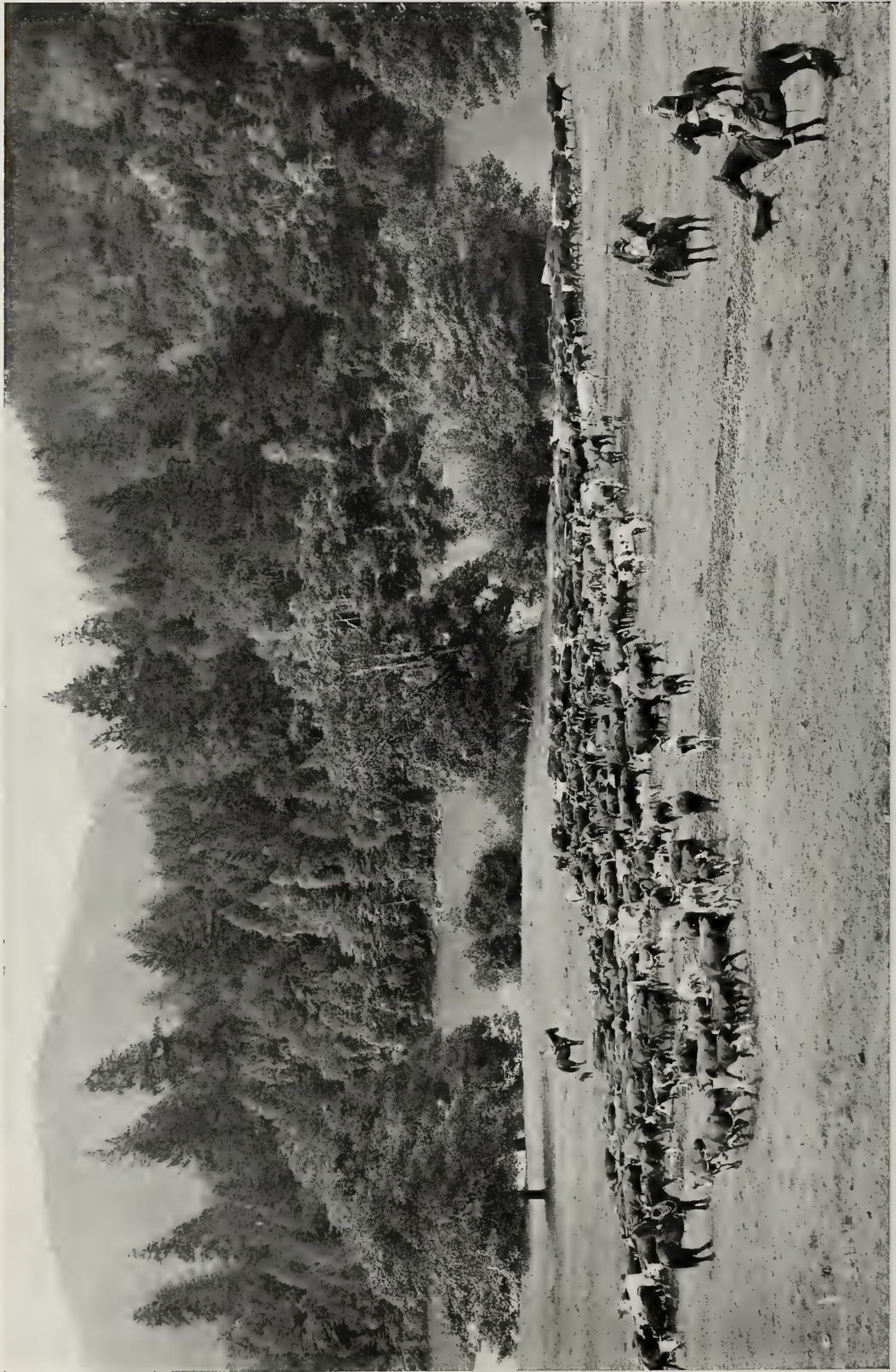
The report of the Department of Agriculture for the year ending June 1, 1914, showed the California cotton crop 100 per cent perfect. This means that the cotton from this State is not tinged with rust and not affected by rains or cool nights. California is at the

head of the list, while the general crop for the United States was 74.3 per cent of normal or seven per cent below the ten year average. In other states than California the cotton crop was the lowest of any time since 1871 with the exceptional years of 1903 and 1907. These facts would indicate that in California are ideal conditions for growing cotton.

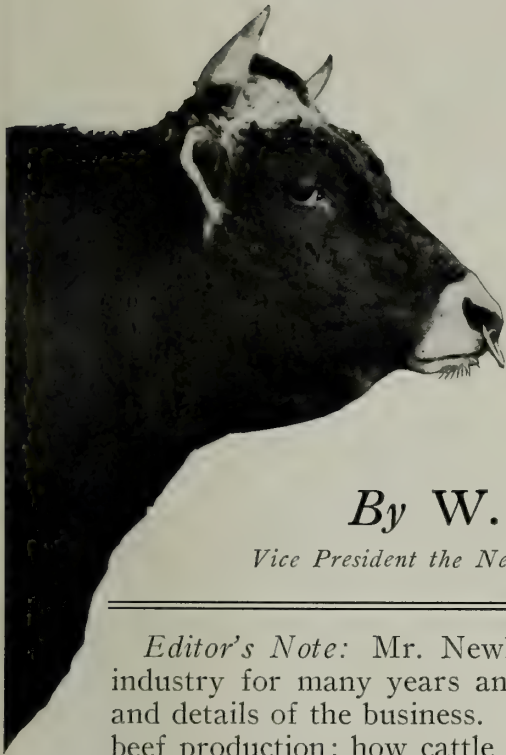
When Sir William Willcocks, designer of the great Assuan Dam in Egypt, visited Imperial Valley he was struck by the similarity of the soil to that of the Delta of the Nile. He realized, as many others have, that another delta has appeared as a competitor in the market of high-priced cotton. The silt is about the same as in the Nile Delta. Sully, the cotton king, made a fortune on the cotton market by estimating the amount of fertilizer used in the Old South cotton belt. In California fertilizer is not used and will not be for many generations, the silt being twelve feet deep and the water used in irrigation containing a large percentage of accumulating silt.

The best time for planting cotton is from April 15 to May 15, but success has been achieved by planting before or after these dates. Some farmers have reported poor success in growing cotton, but in practically every case near-failure was due to inexperience, and lack of scientific methods. Government experts say that in California conditions are ideal for the growing of cotton. There is practically no rain to discolor the lint; there is ample water for irrigation; there are warm nights and sunlight and heat in day time for a maximum yield. The country is free from pests. A blight has never occurred. In spite of this the government maintains a quarantine on all cotton seed, preventing importation, except for experimental purposes.

Who will be the cotton grower of California? He must be intelligent and must know that the best grades, whether Durango or short staple, are grown in California. He who realizes this and the fact that the present valuation of land adaptable to cotton growth is between \$100 and \$200 is the man who will achieve this distinction and reap the profit.



A California Cattle Range.—Courtesy Northwestern Pacific Railroad



California Range Cattle

By W. Mayo Newhall

Vice President the Newhall Land and Farming Company

Editor's Note: Mr. Newhall has conducted a large cattle range industry for many years and is thoroughly familiar with the scope and details of the business. He tells why California is unequaled for beef production; how cattle growing began and has been continually improved both in quality of stock and policy of handling them, and he sketches the outlook as exceedingly favorable for this important branch of industry. Even the romantic phase is not overlooked by the author in his entertaining contribution.

EVER since California's earliest days its remarkable suitability for cattle raising has been unqualifiedly recognized. The comparative mildness of its winters and the nutritive qualities of its grasses have been the main factors of this suitability. The principal grasses, being annuals, are self seeding, and germinating during the winter rains, growing during the sunshine of spring, and maturing on the ground during the rainless summer give continuous feed after reaching a length of two inches, and until destroyed by the succeeding winter rains when the grasses are followed by another self-seeded crop. The general conditions for cattle raising have always been as nearly favorable as ever prevailed where unaided nature was responsible.

The cattle industry on the range has always been associated with a certain degree of romance. The touch of nature, the life in the open, the necessary horsemanship, the occasional hardships and the not infrequent

demands of courage have been elements appealing to the manly romantic side of the human race.

Nowhere, perhaps, was this life more attractive and romantic than during the early pastoral days of California. From the days of the Mission foundings to the early sixties cattle raising was practically the only industry of the people. These animals furnished food from their flesh and articles of certain utility from their hides.

During the thirties a trade industry opened. Ships from the Eastern seaports found their way around the Horn to the shores of California and inaugurated a barter business. Clothes, certain foods, articles of utility and ornament were exchanged for hides and tallow; the exchange generally being on the basis of these articles at many times their cost for hides and tallow at half their value. This was the commencement of a California cattle business.

Prior to the acquisition of California by the United States large grants of land had been made by the Spanish crown to individuals of the resident population for the special purpose of cattle raising. The tracts, as best adapted for that purpose, were usually the first ranches or grants selected, and were in area from about 8000 to 10,000 acres to the limit area of 50,000 acres.

The number of cattle rapidly increased and in addition to those killed solely for their hides and tallow, quantities were frequently destroyed to prevent overcrowding. Cattle were everywhere. It is well within the personal remembrance of the writer when such now highly cultivated counties as Napa, Sonoma, Suisun, and Santa Clara were merely cattle pastures. From the earliest days until into the sixties the cattle were of inferior quality. They greatly resembled the Arizonas of former years and the Mexicans of today, length of horn and leg, speed, and absence of width being the chief characteristics.

SPANISH AND AMERICAN CATTLE

In the thirties or forties a trading ship would occasionally bring two or three head of some variety of breeding cattle from the New England states. Their advent was a sensation and their possession eagerly sought for. Their debut upon any particular ranch was celebrated by fiestas, barbecues, and occasionally by a mass at the nearest mission. The owner was an object of general congratulation and envy. These cattle were given a consideration to the fullest extent of the owner's resources, and their direct progeny and cross progeny were used for the intended betterment of the native herds. These imported cattle, of no matter what breed, were universally given by the Spanish owners the complimentary title of "American Cattle." So accepted was this name that subsequently assessors so designated them on their descriptive list—and even to this day there will be found on the assessors' blanks of several counties the term "American Cattle."

The betterment and improvement of the native cattle were slow and unsatisfactory. It

was not until the early sixties that there was any general or noticeable improvement in the cattle of the State. During the sixties some of the American rancheros commenced to improve their herds by having bulls brought by ships around the Horn, or by purchases of American stock brought by emigrants across the plains. Naturally these animals were not of the best, nor was there available in America at that time any breeding cattle of particular quality.

It was only some years after the opening of the transcontinental railroad that any proper importations were possible. As a matter of fact it is only within the past ten years that there has been any systematic importation of breeding stock of proper quality of various breeds desired.

In the improvement and development of the beef cattle from the native stock of this State the several beef breeds have been used, by the direct breeding of one strain or by cross breeding; the result being that for commercial purposes the cattle raised in this State are today as good in quality and character as necessary—especially among the enterprising and conversant cattle raisers. With more care and attention in the management and maturing of animals there is no excuse on the part of any one in not having beef cattle of a proper commercial standard.

THE COMING OF THE BREEDS

In the earlier seventies there was a somewhat popular wave to cross the Devon breed upon the native stock. This, except for an improvement in the unimportant matter of color, was not a success. Then followed the general use of the Durham or Shorthorn breed. This developed at once a marked and noticeable improvement—as the use of that breed on inferior stock always does. In fact, it has been proved to be the one suitable breed for the first cross on inferior stock. From his experience the writer has had occasion to unqualifiedly recommend to some Hawaiian cattlemen and to an agent of the Japanese government the use of the Durham or Shorthorn breed for the first two or three crosses on their native

cattle as a proper method of creating from their native stock a suitable basic quality of cattle.

Following the first improvement of the California cattle by the use of the Durham or Shorthorn breed other breeds were used on this imported stock. The Polled Angus cross on grade Durham cows produced most satisfactory animals, but for range uses the Angus was not entirely satisfactory. The calf crop was always short and, in the rougher countries, there was a decided tendency for these hornless cattle to become unduly wild. Of recent years a cross of pure bred Herefords upon the grade Durham cows has met with the entire approval of many experienced cattle raisers. The cross of the Hereford has made a somewhat earlier and surer maturing animal and better rustler on the range. A possible objection to the use of the Hereford may be found in that pure bred bulls only should be used, and which is somewhat expensive. High-grade bulls on good grade cows produce results which are wholly satisfactory. In fields with plenty of feed and convenient water the straight Durham can not be improved upon. On the range, however, where some rustling for food and water is generally necessary the cross of the Durham with the Hereford seems advisable.

The ranches or ranges with open hills and with a certain amount of brush or timbered hills for winter shelter seem to have been the best adapted for the cattle industry in this State. Not infrequently the valleys and lowlands produce a growth of feed often too rank for best maturing and fattening results. And for the reasons of better quality of grasses and for winter protection of cattle many of the first acquired ranches were purposely selected for their open hills and timbered tracts in preference to lands now of the highest agricultural use. But this is of the past. This is a time when higher development did not exist and of a time when the meat supply was greater than the demand.

THE CALIFORNIA OUTLOOK

But what of the future? How is the meat supply to meet the growing demands? How

are the large areas of rougher country to be utilized? With the cutting up of the large tracts and the diversion of those parts of cattle ranges adapted for agricultural purposes the area for the breeding and fattening of cattle has been more and more restricted.

The gravest problem confronting the industry is the breeding and raising of sufficient cattle to the age of one year. With the fields of alfalfa and other foods under irrigation there is no difficulty whatever in the feeding and maturing of cattle. The problem is to get the cattle.

The breeding and raising of cattle on the range requires area. It is not improbable that the cattle industry in the future will be divided into two departments. One devoted exclusively to the raising of cattle and the sale of them as weanlings or in their yearling form for feeders; the other devoted to the maturing and fattening of these cattle without undertaking any breeding. Feed and climate conditions, adaptability of sections, qualifications of men would almost predict this method. Many men qualified to raise cattle are not fitted as feeders and vice versa. And many lands suitable for the mere raising of cattle are not adapted for their maturing and fattening. Some owners with several ranches have for years followed the plan of devoting certain ranches exclusively to the breeding of cattle and used other ranches, better adapted, exclusively for maturing and fattening.

There is no doubt but that the area devoted exclusively to the cattle industry has diminished, nor is there any doubt but that it will continue to diminish.

How shall the situation be met?

In a very great measure it may be met by the use of the rougher lands exclusively for the breeding of cattle and by selling the progeny as weanlings or as yearlings. There are thousands of acres in the State of private or government ownership suitable for the breeding of cattle but not adapted for maturing or fattening; and this is also emphatically the case with many ranches, formerly recognized as good stock ranches, where considerable parts have been put to agricultural uses

Will the breeding of calves alone pay? On a reasonably good range with a carrying capacity of 100 head as a unit there should be turned off yearly eighty weanling calves at, say eight months of age, for a total of \$1600, or \$1750.

It is the opinion of the writer that a serious setback to the production of cattle in this State has arisen and exists today in the attempt to mature and fatten on ranges suitable only for breeding, and that a much greater area in the State could be utilized if used for breeding purposes only.

PRACTICAL SUGGESTIONS

To those who might engage in breeding only and selling calves as weanlings the suggestions would be—avoid dairy or milking strain cows—use only good bulls of pure bred or high-grade Durham or pure bred Hereford breeds—do not use them before two years of age nor after six years old. Allow one bull to every twenty or twenty-five cows, according to the roughness and size of the country. Do not breed heifers under two years of age nor cows after their eighth year. If practicable keep the two-year-old heifers separated from older cows during their first season of breeding; put the two-year-old bulls with the two-year-old heifers the first season. Reserve twenty heifer calves for each 100 head of breeding cows. Sell for feeders each year all the dry and older cows in excess of the 100. Take out the bulls in the fall; care for them during the winter, and turn them out with the cows in the spring so that calves will commence coming in January, February, or March, according to the average weather and grass conditions of the individual ranges. The earlier calves may safely come the better so that the cows may get the benefit of the spring grass while raising their calves. As a general rule it is safer not to have calves come before the first of February. The calves are at their best weanling and salable age at seven or eight months.

If the range is not more than say ten miles

from a loading point, the calves may be shipped to purchaser without being weaned at home. If necessary to be weaned before shipping, the calves should be put and kept in a tight enclosure for two weeks and fed in racks and watered in troughs. A few gentle dry cows put with the calves for the first few days has a quieting effect. If alfalfa hay is fed to the calves straw should be available to prevent possible scouring. The calves should not be driven more than ten or twelve miles per day to the loading point, and food and water should be provided for at camping places.

The demand for weanlings and yearlings is practically unlimited. Thousands of Arizona and Mexican cattle are brought into this State every year for maturing and fattening, and from Nevada and other states finished cattle for immediate slaughter. According to the best available information there was brought into this State for maturing, fattening, and slaughter during the twelve months prior to October 1, 1914, something more than 350,000 cattle.

Every cattleman would greatly prefer native stock if it were available. There is not a single cattleman having facilities for the maturing of cattle but would gladly go out of the department of breeding to the full extent to which his needs might be supplied by the opportunity to purchase weanlings of desirable kind.

The people of California are insatiable beef eaters. In the early days it was the custom. From a custom it has become a habit. The habit is a characteristic of the country. There is a popular cry for more cattle. There is a demand by large and small owners in the valleys of the State for feeders.

It seems proper in concluding to emphasize that only by the utilization of much country suitable for breeding alone, and the making of breeding and maturing special and distinct departments can large areas of this State be beneficially used and an increased home beef supply be expected.

The Shorthorn *in* California

By David J. Stollery

Editor's Note: The late Mr. Edward W. Howard was requested to write the following article, but his untimely death in San Francisco on January 19, 1915, prevented. Mr. Howard was president of the Howard Cattle Company, ex-President of the California Live Stock Breeders' Association, for many years a member of the California State Board of Agriculture and, just prior to his death, was elected a director of the American Shorthorn Breeders' Association. By request the article was written by Mr. David J. Stollery, who as assistant to the president, has been connected with the Howard Cattle Company for nearly ten years.



A typical Shorthorn

THE Shorthorn has more largely influenced cattle production on the Pacific Coast than any other type, and in this particular has perpetuated the general traditions of the breed, as the Shorthorn is the most widely distributed and numerous represented of all British cattle.

The original home of the Shorthorn is on comparatively level land, rich in feeds, both cultivated and natural, and the adaptability of the breed is readily appreciated when we take into consideration the different conditions under which it exists in our own State.

In so far as beef production is concerned the name of the Shorthorn will go down in history. Evolution is slow, and while in England practically all cattle are pure bred, this is a result of very many years of close care and attention to breeding, and in a comparatively small way. The application of intensive methods of breeding under our conditions is more difficult than in older countries.

Here our cattle of necessity receive very little attention, because of the vastness of our agricultural enterprises. In the inception of California's history our cattle were of a low



Straight Archer 21st. A fine type of Shorthorn

standard, and it was only with the introduction of pure bred—particularly the Shorthorn—that the quality of our range cattle began to improve. The remarkable faculties with which the Shorthorn is endowed in the transmitting of his own excellent qualities to his “get,” and the handing on of his early maturing powers to his offspring, was one of the controlling factors in this improvement.

When one considers the magnitude of the cattle industry in this State the importance of such improvement is readily appreciated.

There are a number of corporations on the Pacific Slope which each own a half million or more of cattle. It is difficult to realize what a problem the grading up of such vast numbers presents, especially when one considers the proportionately small production of pure bred breeding cattle and the large numbers necessary to be imported in order to bring about this indispensable grading up process.

Fifteen years ago it was a difficult matter to sell a pure bred registered bull for range use, but the meritorious doctrine preached by our breeders of pure bred cattle has had a most beneficial effect on the welfare of this

important branch of our agricultural industry. Our State Fair has done much to extend the doctrine of pure bred merit. Since its inception the strongest representation in the beef classes has been made by the Shorthorn, which has outnumbered the other breeds, probably four to one.

Not alone must the beef raiser figure on the quantity of feeder beef which he has in prospect, but he must also figure very carefully on the quality of his breeding plant. The discriminating stockman, and there are many such in California, is at no loss to perceive the merit in the use of pure bred sires. For this reason the breeders of pure bred breeding stock are unable at this time to supply the large demand for good bulls.

The general desirable physical characteristics of Shorthorns eminently fit them for the conditions which they encounter within our borders. It would be difficult to find a breed that will produce the same weight for age, as does the Shorthorn. The problem of meat production is to produce the greatest amount of merchantable beef in the shortest possible time, and this under reasonable conditions the

Shorthorn will do. Furthermore, their ability to transmit their scale and substance to whatever cattle they are bred to has made them of incalculable value in the grading up process, which is the greatest factor to be considered in states like this, where rapid achievement of good results is all important.

Tremendous numbers of native Mexican cattle have been brought into this State within the past few years. These cattle, while well formed, are small and afford very little scope to the breeder, because of their slowness in growth and their relatively light weight when at last ready for the block. Here the Shorthorn has shown his marked ability in transmitting his substance by crossing with cattle of inferior quality, such as these. This is incontestably shown by the results achieved.

Because of the proportionately small number of breeding plants within this State, it has been found necessary to make importations of large numbers of males to distribute throughout the ranges. For this purpose the Eastern and Middle West states have been habitually scoured with the end in view of obtaining high-class bulls, suited to the conditions under

which we operate. Always, in our investigations, we have naturally been influenced by the law of supply and demand, and it has become, each succeeding year, increasingly difficult to obtain desirable Shorthorn bulls, not because of the fact that fewer have been raised, but by reason of the tremendously increased demand for bulls of Shorthorn breeding.

LATIN-AMERICAN MARKET

A number of the South American republics have been buying largely from the United States within the past decade, and the Pacific Coast states have been shipping quantities to the Hawaiian and Philippine Islands.

INTENSIVE CULTURE IN THE LIVE STOCK INDUSTRY

In nearly all branches of agriculture intensive principles have in this State been generally applied. However, in the production of beef, owing to existing conditions, this is not generally the case. The reason for this is that there still exist comparatively large areas of land not useful for other purposes, which can be profitably used for maintaining herds of beef cattle under range conditions.

The problem, therefore, has been to select



Shorthorn calf herd

cattle which will produce the best results from the resources at hand and this the Shorthorn has been enabled to do by reason of his vigorous constitution, assimilative powers, and remarkable precocity.

There is now just beginning a tendency toward the application of more intensive methods to the cattle industry itself.

Much has been and is being done toward applying principles of feeding and breeding which will most rapidly bring about the best results, and our State Farm has co-operated with many of the breeders toward this desirable end. The introduction of county farm advisers, of whom there are now several in this State, has placed the stock raiser in a position where he can readily obtain a fund of practical information.

CALIFORNIA SHORTHORN INDUSTRY

The first importation into California of pure bred Shorthorns was in 1857, when the bull Orion and three cows were brought into the State by the late Mr. William D. M. Howard. With these as a nucleus, Mr. Howard established a pure bred herd, the descendants of which, augmented by many other importations, are now owned by the Howard Cattle Company, and at present constitutes one of the best herds in the State. Until 1887 the Howard herd was kept within twenty miles of San Francisco, on what was known as the San Mateo rancho, where also Mr. Howard maintained a splendid herd of dairy Shorthorns.

PROMINENT BREEDER

In the annals of California Shorthorn history the name of the late Mr. Robert Ashburner stands out prominently. His operations were confined to the dairy type of Shorthorn, and upon his death in 1907 the herd was dispersed. Much credit, too, should be given to such breeders as the late Mr. J. H. Glide of Sacramento, Cal., his wife and sons, the late

Mr. Thomas Gibson, the Kern County Land Company, and to Mr. A. W. Foster, all of whom devoted themselves to the industry and went to great lengths to secure the best possible types with which to improve their herds.

The Paicines rancho has been instrumental in bringing into this State a large number of the famous Elmendorf herd from Kentucky.

California's most recent acquisition in the field of Shorthorn endeavor is the Whitehall Estates Company, which corporation recently secured a ranch near Tracy, Cal., where it is conducting operations on a large scale, having brought out a number of the cattle bred by the firm of White and Smith, of international fame.

As typifying in some degree the quality of Shorthorns imported into California within the past few years, such bulls might be mentioned as King Edward, imported Straight Archer, College Count by Lavender Viscount, Signet, Ring Leader, and Music Master, both by Ring Master, Fond Lavender, sons of Choice Goods, etc.

The acquisition of bulls of such breeding and individuality as those above named, in conjunction with Shorthorn cows of like quality and breeding clearly indicate that expense at least has not been considered in the endeavor to evolve and perpetuate the best possible types.

The cattlemen of California are looking forward with much pleasurable anticipation to the prospective exhibits of Shorthorns, which, from far and near, will be shown at the Panama-Pacific International Exposition. The cattle thus exhibited should display all that is best in the breed, affording to the live stock producers of this great State, the gratifying opportunity of observing the methods employed and the results obtained by some of the greater minds engaged in the industry, and, by applying the knowledge thus gained, pave the way to our own greater achievement.

The Hereford and the Range Interest

By J. W. Goodwin

President of the Oro Electric Corporation

Editor's Note: Mr. Goodwin writes as an owner of range property which he has developed by the use of the Hereford breed. He presents brief, striking statements about the range and beef stock interests of California and the important relation of the Hereford breed thereto. He describes the success this breed has scored in California and how it is used to best advantage in the range industry under our conditions. His statement will especially interest Hereford men wherever they are in the world.

GREAT BRITAIN is the great mother of breeds. To her we owe more on account of the origination of the present breeds of beef cattle than to all the rest of the world combined. So, from Herefordshire, sprang what we know as "Hereford," very generally known as the "white face breed." And well they were so named, as the characteristic seems to be very persistent even when the breed is crossed with other breeds.

Mr. John Speed, in a book published in the year 1627, speaks well of the Herefordshire cattle, while Marshall, in 1788, describes the Hereford in a way that would very well answer as a description of these cattle for the present day.

The Herefords descended from one or more of the original breeds of Great Britain and show a common ancestry with the Devon and Sussex breeds. Their color was originally red, but at an early period they were crossed with the white cattle of Wales which enlarged their frames and imparted a tendency to white markings, and the white markings thus originating were further fixed and intensified by white-

facéd Flemish cattle imported into England from Flanders by Lord Scudamore, in the year 1671, and by the use of white-faced bulls, which were collected from various parts of England, probably with a view of producing the white face as well as a larger size. Their large size is also due to an abundance of food in Herefordshire, as well as crossing the original breed by animals of larger build.

These cattle were noted for good grazing and beef making qualities in the eighteenth century and were much sought after for use as oxen at a time when oxen did much of the work that today is accomplished by the tractor and motor truck.

EARLY BREEDERS

Mr. Benjamin Tompkins, who lived from 1714 to 1789, and his son (1745 to 1815), were the principal early breeders and improvers of Hereford cattle and the best herds built up in England obtained their foundation from the herd belonging to the younger Tompkins, who built up and improved it through the most careful selection in mating and in breeding. At the dispersion sale of his stock in 1819

his breeding animals sold at an average of more than \$700 each.

During the first half of the eighteenth century Herefords won more prizes at the Smithfield London show than did the animals of any other breed.

The first accredited importation of Hereford cattle into the United States was made by the statesman, Henry Clay, in 1817. Between 1839 and 1843 Mr. William H. Sotham, who probably did more than any one else to advance the Hereford interests in the United States, made three successive importations into the state of New York, and from these, and importations made by Mr. F. W. Stone of Ontario, Canada, many of the herds of the United States have been built up or enriched.

The American Hereford Cattle Breeders' Association was organized in 1881 and the first volume of the "American Hereford Record" was published in 1880.

CHARACTERS OF THE HEREFORDS

Herefords readily adapt themselves to changed conditions of soil or climate and they are exceedingly docile, which is favorable to such adaptability. They are well suited to arable countries, either level or gently undulating in character, and respond well to rich production of pasturage. They have proved themselves eminently fitted for range conditions, such as prevail in the Western and Southwestern states. They are likewise hardy in northern latitudes; they are better adapted relatively than the Shorthorns to warm temperatures.

In average size and weight as a breed, they are almost equal to the Shorthorn. In early maturing qualities they are fully equal, and, like the latter, with good feeding they may be made quite ready for the block in two and a half years. Their grazing qualities are much superior and they take on flesh rapidly in good pasture. On the dry and sparsely grassed pas-

tures of the open range in the Western United States and Mexico, they have largely displaced all other breeds. They make good use of the food given them and lay on flesh most heavily on the part of the frame from which the best meat is cut—the back and the loin. Under heavy forcing they are somewhat inclined to patchiness. The quality of their meat is excellent and finds great favor with butchers and consumers. It is juicy and tender and the fat and lean are nicely blended, the proportion of the lean to the fat being relatively large; they dress well, the dressed weight to the live weight being large.

The milking qualities of the Herefords were at one time quite good, but they have been bred more for meat producing purposes and the milking qualities are not equal to those of the Shorthorn. The quality of the milk is good, but it is frequently deficient in quantity. The Herefords cross well with the Shorthorn. In crossing with the latter breed, the best result has been obtained when the male was a Hereford. Herefords answer well for crossing upon grades and common stock when meat production is the object sought.

The breeding qualities of the Hereford are good and when subjected to high pressure feeding they still breed with regularity and frequently to an advanced age. They are less subject to abortion and milk fever than many other breeds. Compared with the Shorthorn, they are ahead in breeding and grazing qualities as well as in the quality of meat. In size, adaptability, maturing and feeding qualities and utility in crossing, they are about on a parity with the Shorthorn, but in milking qualities, as already stated, they are scarcely equal. The hide of the Hereford makes a very superior shoe leather and is much sought after for this purpose.

In color, the face, throat, chest, legs, lower part of body, crest and tip of the tail are a beautiful white, all other parts being red.

Sheep *and* Wool in California

By F. A. Ellenwood

*Secretary California Wool Growers'
Association*



A patriarch among sheep

Editor's Note: Mr. Ellenwood is clearly the Californian who has given fullest and closest attention to the agriculture and economies of wool growing in this State. He has been for years a leader in the effort by which Californians have co-operated with the national association to secure protection and advancement for American wool growing. He is careful, calm, and rational, and his work is of a natural character while at the same time full and dependable with reference to the special California phases of sheep husbandry.

THE sheep business in California is no doubt one of the very oldest industries in the State, if not the oldest, its only historical rival being, possibly, the cattle business. Sheep were first introduced into California in 1773, having been brought here by the Spaniards from Florida, seventy-five years before the discovery of gold. The number of sheep increased quite rapidly in early days as there was no demand for the meat until after the arrival of the miners in 1849; by this time California had about 17,000 sheep, all owned by the Spaniards and Mexicans.

PRIMITIVE METHODS

The methods of handling sheep were practically the same as prevailed in the old country hundreds of years previous. No matter how large or small the flocks, they were camped or bedded in the same place together at night.

If there were 3000 sheep in the flock with three shepherds to care for them, in the morning one shepherd would start ahead with the sheep following him; after about one-third of the flock had followed him, another shepherd would stop them, then after waiting a few minutes would start in another direction with about half of the remaining flock following him; likewise the last man went in still another direction with the remainder of the flock following him. After leading their respective flocks to the best feed and water in the day time, they all came back and camped together again at night in one flock.

For a long time sheep, like cattle, were raised principally for their hides and tallow; however, if they wanted to shear them they never thought of a shearing shed or even a small corral, where they might be more easily



A band of Shropshires

caught. Each sheep was caught with a rope by lassoing, the same as cattle were in branding, and pulled up to the shade of a nearby tree and sheared, generally by the same man that roped it.

If the sheep belonging to different owners became mixed they had to be separated by roping each individual sheep in a large corral and putting it on the outside until all the sheep of one mark and brand were on the outside and those of another on the inside. These methods of handling sheep prevailed until about 1860, and even later, at which time there were in California over a million sheep. About this time the pioneer shepherds from the East began to engage in the industry here, some of them bringing their flocks across the plains from Missouri. Think what it meant to bring a flock of sheep across the plains in '57, swimming creeks and rivers and crossing the desert in addition to the other hardships and perils of that time!

DEVELOPMENT OF THE INDUSTRY

The period, 1860 to 1880, marks the rapid increase in the number of sheep in California as well as the change in methods of breeding and handling. Until about 1860, nothing but the native Mexican sheep, shearing about two pounds of wool annually, could be seen. Our pioneer shepherds, from their experience in the East, knew that such a type of sheep was not a paying proposition, or at least there was room for improvement. They immediately began to import heavy shearing Spanish-Merinos from Vermont, Cotswolds, and Lincolns from

England, paying \$500 and even more for individual rams, and it is worthy of note that at this time great care and attention was given to the art of breeding, even more so than a few years later when quantity was uppermost in the minds of sheepmen, rather than quality; thus the foundation was built for some of the best flocks in the West today. After a few years of careful breeding the average weight of each fleece was increased about 50 per cent.

In this period more up to date methods of handling sheep were brought into use. Each man, now called a herder, was moved to a camp by himself and his band kept separate both day and night; other men called camp tenders would look after the herders, usually there being one camp tender to three herders. Rough shearing sheds were built where a few sheep could be penned for a shearer to catch by hand without being roped; generally from six to ten shearers would work in the same large corral together. A framework would support some branches of a tree or old pieces of canvas for a roof and the ground would answer for a shearing floor.

SEPARATING THE BANDS

If two bands of different marks accidentally became mixed it was no longer necessary to separate them by roping or even legging them out by hand. A corral with separation chute through which the sheep were forced to pass one at a time replaced all this. A chute is about twelve feet long, usually about two feet wide at one end, where the sheep enter, and perhaps fourteen inches wide at the other end,

where the separation is effected by a dodge gate, a simple contrivance working from one side to the other of the chute. As the sheep pass through the chute, one man, operating the dodge gate, catches all of one mark on one side and all of the other mark on the other side, so that when they have all passed through each band is by itself just as it was before getting mixed. This could all be accomplished now in less than an hour when it would have taken a day or more of hard work a few years previous.

This period also designates the beginning of our present necessary (in some sections) but somewhat dangerous system of taking sheep to and from the mountains for summer grazing. Prior to 1870 sheep were kept practically in the same localities, summer and winter, but now they were increasing so rapidly some other plan had to be devised. In the month of May, which usually marks the beginning of the dry season, the feed on the winter ranges becomes perfectly dry and would burn easily, but in the mountains, perhaps a hundred miles distant, where the winter snow has just melted, the grass is green and water plentiful; but between the green feed in the mountains and the winter ranges in the valleys, there is most always a high summit to cross, with little or no vegetation thereon, and this causes the danger in driving to and from the mountains. When forced to leave the dry winter range in May, snow storms may occur while crossing

the high summits. This has often happened and hundreds of sheep have perished in a single storm.

MORE ROOM SOUGHT

From 1860 to 1870 the number of sheep had more than doubled so that some sheep men began to hunt for more room or new country. About 1872 bands were driven to Nevada to experiment in wintering in the sage brush country, but after trying it there for two winters with considerable loss these men returned to California with the remainder of their sheep saying that sheep could not be wintered in Nevada successfully. Think of this and compare it with the fact that about a million sheep are wintering in Nevada at present!

In the last ten years of this period, from 1870 to 1880, the number of sheep again more than doubled, placing California in the lead over other states in the Union in the number of sheep, having a total of 5,727,000 sheep, producing annually about 17,000,000 pounds of wool. This placed California second in wool production, Ohio being first in this respect, with over 25,000,000 pounds.

This period also designates the high wool market of all times. From 1870 to 1880 wool was very high, due partly to the fact that the duty of 11 cents per pound on grease wool was now in effect, the law having been in operation only a few years. The duty on grease wool at this time enhanced the wool prices here very materially as the manufac-



Vermont Merinos



In exhibition form

turers and importers had not yet applied their effective system of beating the tariff by importing light, shrinking wools only, as they did a few years later.

However, this is not the place to discuss the tariff, but I can not refrain from calling attention to the fact that high wool prices do not necessarily mean high prices of woolen goods; or, in other words, the cost of the raw material has but little to do with the retail price of the finished product. As an illustration, one of the pioneer sheep men, Mr. J. M. Howell of Red Bluff, to whom I am indebted for much valuable information on this subject, sold his wool in 1872 for 50 cents per grease pound, tags and all, just as it came from the sheep's back; at that time the range of wool prices was from 48 to 52 cents per grease pound. This same year Mr. Howell bought a pair of all wool blankets, weighing twelve pounds, and paying for them \$12, or just \$1 per pound. They were the very best, in fact it is almost impossible to secure such blankets at any price today. A few days ago I went into the same store where Mr. Howell bought his blankets forty-two years ago and secured a pair of the best blankets there, the cost of which was \$12, the same as Mr. Howell paid, but how much did they weigh?—five and one-half pounds! Two dollars and eighteen cents per pound, more than twice as much per pound for blankets today as in 1872, while wool at present is

selling at from 16 to 20 cents per pound, Mr. Howell having sold his this year for 18 cents, just a trifle more than one-third of the price received by him in 1872. Today the raw material is costing just a trifle over one-third as much, but the finished product is selling at retail for more than double the prices obtained in 1872.

CALIFORNIA BUILDS UP OTHER STATES

The period, 1880 to 1890, is remarkable from the fact that California shows a marked falling off in the number of sheep, while Montana, Utah, Wyoming, Idaho, and Nevada all increased in the number of sheep by leaps and bounds, Montana having eight times as many sheep in 1890 as it did in 1880.

In this decade many big drives of sheep were made from here to inter-mountain states with several thousand in each drive, thus reducing the number of sheep in California and assisting materially in the rapid increase in the inter-mountain states. Many, if not most of the great flocks in these states today trace their origin to California. In fact, many of the sheepmen in the inter-mountain states came from California or are the sons of men from California.

In the last twenty-five years, 1890 to 1915, the number of sheep have been gradually decreasing, in fact rapidly in the last ten years, until now California ranks only about tenth in the number of sheep having only in round figures about one and one-third million sheep.

There are many causes for this, chief among them being constant tariff agitation, increased cost of production and colonization.

Constant tariff agitation has helped to reduce wool prices from an average of about 30 cents per pound to an average of about 16 cents, and at the same time the cost of production has been rapidly increasing, thus forcing many to abandon their flocks; labor costs more, while the efficiency is much less, provisions of all kinds are higher, feed is much more expensive, in fact every cost item has materially advanced. The principal reason, however, for the decline of the sheep industry in California, more than elsewhere, is the fact that many of our former sheep ranges have been put to other uses. Orange groves, olive orchards, hop yards, fruit trees, and alfalfa fields now occupy thousands of acres, where only sheep once grazed, until at present the sheep occupy only the poorer or rougher sections of the State.

In spite of this the importance of the sheep industry to the State should not be overlooked. The amount invested is small compared with some of the other industries, possibly, yet it is perhaps greater today than ever before, even with fewer sheep than formerly. The total investment today in sheep, equipment and

sheep ranges is about \$20,000,000. When California had over 5,000,000 sheep the total amount invested was but little, if any, more than it is today, as it was not necessary then to have much invested in real estate, and the value per head was much less than at present. Today real estate represents the largest part of the investment, thus giving more stability to the industry.

Its importance to the State in another way can not be measured in dollars and cents. While the gold dredger tears up and destroys, the constant production of grain crops impoverishes the soil, the sheep is always adding to its richness. Many of our orchards would not be so productive today were it not for the fact that sheep grazed there for years and assisted in making the land more fertile. Sheep ranges that have been in constant use for grazing for over forty years are producing more feed today than ever before. The government, once radical against the grazing of sheep in the national forests, now recognizes officially that the moderate grazing of sheep in these reservations increases the reproduction besides adding to the fertility of the soil. Travel through New England and the South, where land was farmed constantly for years without sheep being grazed thereon and we find



Pure bred Shropshires

abandoned farms today, yes, whole plantations if you please. Such a thing is not known in California where sheep have been grazing for over 100 years.

For the past year the business has been in direct competition with the great wool and mutton producing countries of the world with no protective tariff on either wool or mutton.

Efficiency and determination must now be inscribed on the banner of every successful sheepman. Old methods must give way to more progressive ideas; shearing sheds are now built with a good roof and with shed room for the storing of wool; each shearer has a neat, clean pen, with a board floor, by himself, where his work may be inspected; shearing machines are in use in many places; the wool must be kept clean and without tags; it must be free from insoluble paint brands; must be tied with paper twine; black wool is sacked separately; accounts must be kept, and every branch of the industry must be looked after in a business-like manner.

For a great many years prior to 1910 wool had been a fair price and feed quite reasonable so that wool was the principal source of income and mutton the by-product. The gross income from wool was about double that of mutton; wethers were kept until two or three and even four years old for their wool alone, before being sold for mutton. Since that time wool has been very low in price with mutton advancing slowly so that conditions had been very unsettled and the sheepmen were at a loss to know what type of sheep was best to produce. Now the demand for mutton is so great that mutton is the chief source of in-



A merino

come with wool as a by-product; in fact, the income now from mutton is double that from wool, just the reverse to the conditions of a few years ago. This fact has brought about the change in the type of sheep now grown from a wool to a mutton type. The mutton type is much more palatable than the wool type formerly used for mutton and most of our mutton is now shipped before it is a year old.

As a result of individual experience and scientific investigation by various state institutions, as well as our national government, it is found the mutton sheep of today is the most healthful meat consumed by the meat eating public. In support of the above I quote from the report of the United States Bureau of Animal Industry for 1911, showing the number of carcasses and parts of carcasses condemned for disease:

<i>Animals</i>	<i>Number Insp.</i>	<i>Carcasses Cond.</i>	<i>Parts Cond.</i>
Cattle	10,000,938	27,390	49,393
Hogs	26,916,363	31,517	870,361
Sheep	13,005,502	.....	.....

These are facts which need no comment.

ONE of the most interesting facts brought out in the above article is in the statement that at last mutton displaces wool, the latter, owing to the increasing cost of meat, becoming the by-product. With the ever-decreasing range and the ever-increasing population, the demand for good mutton increases. The time has arrived when a few high-class mutton sheep can be kept on the average farm at a profit. The farmers of our foothills and interior valleys will in the future consider a small band of sheep an essential part of their stock, just as did their forefathers from the Eastern states and Western Europe, in the past.



Two year old Berkshire sow and litter

Swine Raising *in* California

By A. M. Henry

President California Swine Breeders' Association

Editor's Note: Mr. Henry is president of an association whose motto is "More and Better Hogs" for California. He is therefore representative of all interests involved in the effort to replace the millions value of imported pork—to replace with a home product and manufacture. His article shows how inviting a field swine husbandry is, not only because of market conditions but because climate, soil, and situation give the swine grower such marked advantages for his effort and investment, and he gives many practical suggestions about making a start in this business.

SWINE raising has been profitable to some of the people in California since the "Days of Old, the Days of Gold, the Days of '49."

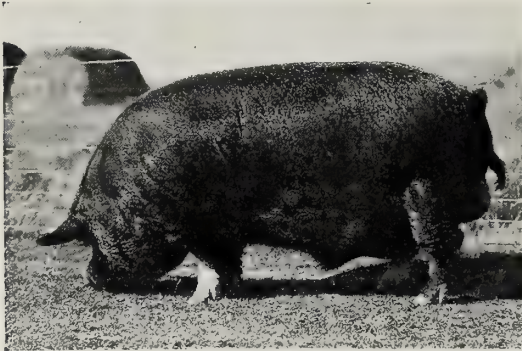
Beginning in the places where feed necessary for the growth of the hog was found without much effort by those engaged in the industry, and then, as the value of pork production became evident, extending to the populous places where the demand made the industry more profitable, hog raising increased in popularity, until now it is one of the leading industries of the State.

When the discovery of gold in California brought the people of every nation to this State what was more natural than that some who did not care to dig in the earth for their wealth should see the way to riches through the production of the food the miners needed and for which they were very willing to pay?

Consequently the land of grasses, roots, and acorns in close proximity to the market led the hog raisers to begin their efforts close to the mines. The demand for meat was so great that the effort to produce the most valuable



Champion Poland China boar



A champion Berkshire



Hampshire boar grand champion at California State Fair



Young Berkshires

animals along blood lines was entirely forgotten, the object to produce the most progeny being the desire of most of the breeders. Consequently the animal produced was the natural result of this process of creation.

Imagine an animal with a snout capable of extracting an acorn from a small crevice, a frame of sufficient breadth to enable the owner to go through the thickest growth of brush, and legs sufficiently long to enable their owner to go long distances in search of food; a prolificacy that enabled the females to produce from ten to fifteen pigs each litter, and you have the genuine mountain razorback hog, the animal on which our forefathers whetted their teeth and which perhaps had more to do with their square jaws than the strong character to which their square jaws are held to be due.

As time went on and farmers began to produce grain in the valleys it became customary for owners of large numbers of hogs to buy the stubble fields in the valleys and drive their herds there for the summer. The writer can remember some of these droves that came to his father's ranch in San Joaquin County. With frames capable of holding large quantities of grain, and an appetite that was apparently never satisfied, they nevertheless seemed utterly incapable of properly assimilating food. After spending the entire summer eating grain they would go back to the mountains in the fall nearly as thin as when they came to the valley, but with greatly increased length of frame. It became so evident that this kind of hog was not just the thing that some of the more far-sighted began to infuse a little Berkshire blood into their herds by the use of a Berkshire male. My father was one of the first, if not the first, in our vicinity to make this effort, and well I remember the excitement in the community when the pig arrived. The neighbors came from far and near to see Henry's Berkshire pig. He caused more excitement in our community than the advent of a circus would have done.

But the improvement thus begun in the various localities was so marked that it was

not long until the importance of blood lines was felt. Gradually the improvement in both quantity and quality of pork began to be noticeable because while the prolificacy that was so evident in the razorback gave way to the improved strains the numbers became less noticeable but the size of the offspring at certain ages was so much greater that it became evident that, even though numbers were less, more pounds of good pork was produced. Then the fairs began to call forth an effort by the swine raisers to see who had the best hogs.

NEW TYPE AND NEW INDUSTRY

And what was the best hog for the production of pork? As this question began to be felt various breeds began to be in evidence on account of the importation of choice individuals by the breeders. The gradual increase in the varieties of fruits and grains and above all the knowledge that alfalfa can be profitably produced in nearly every part of California has forced the knowledge upon our people that we have one of the most favored places in the world for profitable swine raising.

The production of alfalfa which is continually advancing our dairy industry and the invention of the cream separator which enables

the dairyman to separate his butterfat from the skim milk, has also brought forth an interesting question. Is he separating his butterfat or is he separating his skim milk? With pork prices around eight and ten cents per pound as it has been during a good part of the past year it has been possible for a man of good judgment to so use his skim milk as to produce nearly or quite as great an income from this source as from his butterfat.

The combination of skim milk and other kinds of feed makes each of such greater relative value that the skim milk produces nearly as many pounds of pork as would be required, if it were converted into money at the market price of pork, to pay for the butter that could be made from the same milk. By combining skim milk, alfalfa, and any kind of grain that is the cheapest, the swine raiser can produce the ideal ration for the proper growth of his hogs. Coupled with this is the fact that his land will be constantly growing richer on account of the return to the soil of most that is taken from it on account of the waste from the barns, the stock, and the power alfalfa possesses of extracting from the air and conveying to the soil the elements that are needed for the growth of plant life. Then what is



Berkshire up to his eyes in alfalfa, California's premier flesh-making forage, which applies to all kinds of live stock



Reaching the final stage of pork production

more natural than that the swine industry should be one of the leading industries of the State.

There is hardly a place in California where the swine industry is not profitable. Which is the most profitable breed to raise depends greatly upon the abilities of the person doing the raising. If a person likes Duroc Jerseys he will probably do better with them. If he likes Poland Chinas he will do better with them. And so on through the list. Any breed that will do well anywhere will do well in California as we have here every variety of soil, water, and climate.

THE ECONOMICS OF HOG RAISING

What number of hogs can a man hope to raise in California on each acre of land? That depends upon at least two things, the capabilities of the soil and the skill of the man who raises the hogs. Rich land that will yield large crops of alfalfa, grain or fruit will be sure to produce large numbers of hogs, if properly handled.

On one and one-eighth acres of alfalfa the writer kept from fifty to seventy head of hogs of various ages continually pasturing for two months with no other feed. This was for the purpose of experiment to see just what could be done. The alfalfa was flooded lightly and often, one-half at a time, while the hogs were on the other half. They were registered Poland Chinas, and the fact that I sold breeders from the bunch during the time explains why

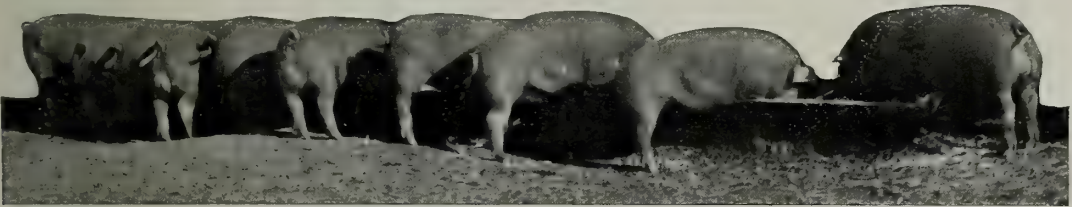
I said there were from fifty to seventy head. They kept in good condition all the time, and while I have never done this again, as I think they would do better on a balanced ration, it shows the possibilities of alfalfa.

In other places where grain is the principal crop grown, a person would have to handle the hogs in such a way as to have them eat most of the waste grain and carry it to market. All over California are ranches where occasionally hogs are raised in conjunction with other products, sometimes on grain ranches, sometimes on fruit ranches, and sometimes on alfalfa ranches, but invariably in a way to help the owner reap a good income from his land. In other places large numbers of hogs are raised to supply the home market for pork, ham, and bacon. This is a market that is constantly growing as the population is rapidly increasing and what market is so good as a home market?

Beside the demand for pork hogs, the market for the various breeds of pure-bred hogs for stock raising is constantly growing. Though almost in its infancy, the demand for better hogs greatly exceeds the supply and on this account the different breeders of pure bred stock are doing all they can to keep up with the times in the improvement of their herds. And so great has been the improvement that where only a few years ago the razorback was in evidence, now only good specimens of the various breeds are seen and a constant effort

is made to maintain the standard of the herds. This is very noticeable at the state and county fairs where the judges are often from the corn belt or the states that have long been in the lead in the swine industry and they have often been heard to say that in our fairs the quality of the exhibits is fully up to that of the Eastern fairs. Our numbers are rapidly increasing

and at the same rate of advancement it will not be many years until California will come into her own as one of the greatest hog states of the Union. In the meantime, those who are in the business of swine raising and those who will be in it have nothing to look forward to that is discouraging, but instead a profitable business in a delightful land.



WHILE the swine industry of California has materially increased during the past decade, it is doubtful whether it has in any sense kept pace with other and similar industries. The traditions have all been against the hog. The tendency to develop cholera at critical times, the lack of uniformity in the quantity of production and the generally accepted assertion that the California-fed pork was an unknown quantity so far as quality was concerned, that it might be high-class or it might be acorn-fattened with an offensive oily flavor; or it might be tule-raised and taste like fish—all these have combined to discourage the systematic and intelligent breeding of swine. In recent years a great change has taken place and we now have intelligent organization and concerted effort in the swine industry, as well as in dairying, the raising of beef cattle and other kindred industries. In Illinois there are sixty hogs to the square mile; California has eight, and we import into this State fifty carloads of pork products, chiefly hams, bacon, and lard, besides about twenty-five carloads of live hogs—not annually, but weekly. This is probably more than half the local consumption. At the rate at which dairying, particularly butter and cheese making, is increasing, more hogs will be needed to consume the by-products. Corn is not a successful crop in California, generally speaking, in comparison with the corn-belt of the Middle West. It grows well in only a few localities of California. And corn is an ideal food for finishing. Kaffir corn is a good substitute and Kaffir corn grows successfully and luxuriantly in our interior valleys. In a government test a bushel of corn produced 11.9 pounds of pork, while a bushel of Kaffir corn produced 10.6 pounds of pork. The best results were obtained with Kaffir corn and skim milk—an ideal combination food for finishing. With our extensive and ever-increasing dairying industry, with alfalfa and with Kaffir corn, California should be second to no state in the Union in the production of the bacon hog.

Work of *the* U. S. Bureau of Animal Industry *in* California

By Dr. H. H. Hicks

Inspector in Charge of U. S. Bureau of Animal Industry at San Francisco

Editor's Note: The bureau of animal industry of the United States Department of Agriculture has always co-operated with those working to build up the stock interests of California and through years of active participation in the work Doctor H. H. Hicks is admirably qualified to write understandingly upon the subject. Doctor Hicks has been in the government service many years in California and other states and he is now inspector in charge of meat inspection for the bureau at San Francisco. He is a prominent member of the American Veterinary Medical Association.

AS MIGHT be supposed, the activities of the bureau of animal industry of the United States Department of Agriculture are somewhat less in evidence in the Pacific Coast region than in the Middle West, where the majority of the great slaughtering and packing plants are situated, and where the large farming operations in the production of food animals and dairy products are centered. Nevertheless much work of interest and importance to the farming and dairying communities, as well as to the general public, who consume the meat and dairy products, is being done under the auspices of the bureau in the far West.

The more important of these lines are the federal meat inspection; the inspection, regulation, and quarantine of live stock for the prevention of disease; the eradication of animal diseases; and work in the interest of dairy farming and dairy products.

A brief outline showing the salient features of the bureau's operations in the State of California follows:

This service supervises all the processes connected with the slaughtering and packing of meat and all other food products derived from the animals slaughtered. While this inspection is primarily concerned only with products that are subject to interstate trade, it is nowhere in force unless the entire operations and product of the establishment are supervised; and since all the important slaughtering and packing establishments are under government inspection it usually follows that the greater part of the meat and products consumed within a State are federally inspected. As a matter of fact approximately 60 per cent of all animals slaughtered for food in the United States, including the farm kill, come under the government inspection.

EFFICIENT FORCE

In California during the past fiscal year inspection was conducted at twenty establishments, located at San Francisco, San Diego, Los Angeles, Arcata, and Pomona. There were engaged in this work nineteen veterinary inspectors, and twenty-seven other inspectors and



Inspecting Sheep at the Summit of the Sierra Nevada Mountains

employees, besides the necessary office forces. There is also a meat-inspection laboratory at San Francisco, with the proper force and equipment to carry on the analytical and bacteriological work.

The number of animals slaughtered and the quantity of the various products prepared under inspection in California during the fiscal year 1914 were as follows:

INSPECTION OF ANIMALS AT SLAUGHTER IN CALIFORNIA			
	<i>Passed for Food</i>	<i>Con- demned</i>	<i>Total</i>
Cattle	137,923	587	138,510
Calves	17,117	36	17,153
Sheep	561,283	467	561,750
Goats	367	1	368
Swine	190,080	1,216	191,296
Total	906,770	2,307	909,077

MEAT FOOD PRODUCTS PREPARED OR PROCESSED IN CALIFORNIA	
<i>Products</i>	<i>Pounds</i>
Beef, cured.....	1,284,155
Beef, canned.....	295,297
Pork, cured.....	9,677,053
Pork, canned.....	53,350
Sausage, chopped.....	4,609,876
Lard	7,204,761
Lard oil.....	6,420
Lard stearin.....	6,707
Lard compound.....	161,382
Compound—lard substitute.....	17,906,786
Oleo stock and edible tallow.....	4,835,966
Oleo oil.....	729,727
Oleo stearin.....	602,079
Miscellaneous products.....	39,570,802
Total	86,943,361

Of the foregoing there were condemned 205,521 pounds.

INSPECTION OF IMPORTED MEAT

The trade in meat from foreign countries with the port of San Francisco bids fair, when the conditions are again normal, to become more and more important. At the present time it is greatly restricted owing to the war. All of this meat is rigidly inspected. The greater portion of the consignments consist of beef from Australia, a considerable part of which is canned beef. Canada supplies cured hog products, bacon, etc., in increasing quantities. This foreign meat trade is of importance not only to California but to other parts of the country as well.

The quantity of meat imported and inspected at San Francisco from the beginning of 1914 is as follows:

IMPORTS OF MEAT AT SAN FRANCISCO		
	<i>Total Imported, Pounds</i>	<i>Con- demned, Pounds</i>
<i>1914</i>		
January	2,720,276	4,574
February	242,638	9
March	1,613,074	40,790
April	1,710,730	31,708
May	473,469	7,086
June	563,710	147
July	1,137,189	3,612
August	1,690,479	868
September	543,369	592
October	884,698	50
November	283,826	.....
Total (eleven months)...	11,863,458	89,436

INSPECTION AND QUARANTINE OF LIVE STOCK

This branch of the bureau work consists of the inspection of all animals imported into

or exported from the United States, and includes the inspection of vessels carrying export stock. It also includes the inspection and disinfection of imported hay, hides, wool, and other substances through which it is possible that contagious animal diseases may enter the country.

In California this work is centered in San Francisco and San Diego. A veterinary inspector is in charge of the operations along the Mexican border from San Diego eastward to Yuma, Ariz. There is also the tuberculin testing of cattle and the mallein testing of horses (for the detection of tuberculosis and glanders, respectively), for shipment to Hawaii and foreign countries, including Canada.

COMBATING STOCK DISEASES

An important means of conserving the live stock of the country and encouraging the raising of meat animals is to eradicate diseases of a communicable nature. As a part of its country-wide work of this character the bureau of

animal industry is operating in California against cattle ticks, sheep scab, and hog cholera.

The ticks not only spread the disease known as Texas fever of cattle, somewhat similar to malaria in people, but do damage as blood-sucking parasites and stand in the way of the production of good cattle. Systematic work for exterminating these ticks, which infested most of the southern part of the United States from California to Virginia, was undertaken in 1906 by co-operation between the federal government and the affected states. At that time the ticks were found in about half of California (the southern portion). So well has the work progressed that only one county (San Diego), now remains in quarantine. The work is being continued there by a force of four federal inspectors.

Sheep scab at one time was so general throughout the West that nearly all the country west of the Mississippi River, including



Dressing Beef under government inspection



An involuntary Bath—Dipping cattle

California, was placed under federal quarantine. Most of this territory has now been released. About half of California is still under quarantine and the federal work in that State is being carried on by a force of six inspectors with headquarters at Sacramento.

Following the discovery by the bureau's scientists of a method of preventing hog cholera by the use of a protective serum, experiments have been undertaken in selected localities in various parts of the country with a view to applying this treatment in a practical way toward the prevention and the eventual eradication of that disease. The work in California is carried on in co-operation with the State agricultural experiment station at Berkeley. This work is both demonstrational

and educational, the object being to show farmers how they may, by their own efforts, reduce the losses from hog cholera. The treatment with the serum is demonstrated at suitable places, and demonstrations are given on farms of methods used in ridding infected premises of the infection of hog cholera through quarantine and sanitation.

SCIENTIFIC INVESTIGATION OF POULTRY DISEASES

The bureau of animal industry and the experiment station are jointly maintaining at Berkeley a research worker who is concentrating his attention upon the poultry diseases known as roup, diphtheria, and chicken pox. This group of diseases constitutes one of the most important sources of loss in poultry. The large industry which exists in California is therefore vitally concerned as well as the country generally.

DAIRY DEVELOPMENT

Work for the development of dairy farming and the study of market milk problems in the far West is being carried on by a force with headquarters at Salt Lake City.



Inspecting Mexican Range cattle

THE DANGER of purchasing impure or diseased meats is entirely removed by the United States Government, which inspects all meats sold for food and stamps in purple the accompanying mark on every piece. It is the government guarantee insuring the people against unscrupulous or careless individuals. In California this work is carried on with the utmost attention to detail and regard for the rights of every one concerned. The importance of careful supervision of an industry as widespread as that of live stock in this State can not be overestimated.





Shire stallion, "Newad Hillside," imported by Henry Wheatley



Shire mare, "Lady Redlynch," of Salvador Stock Farms. Champion California State Fair 1913-14



Quartet of Shire Mares at work on the farm

The Horses Which Move California Industries

By Henry Wheatley

President California Horse Breeders' Association

Editor's Note: Mr. Wheatley, who is well known as an importer and breeder of the style of horses which move things, sketches strikingly the relation of the draft horse to better farming and the opportunity which invites the larger production of such horses, both in the land and in the trade. There is no reason why Pacific countries should depend upon Europe for such breeding stock. Proper production would secure for California leadership in this great industry. Mr. Wheatley gives advice and suggestions to those who can put time, land, and money into this line of production.

THE future development of California is dependent, principally upon more thorough farming. Practically a very large part of the suitable land is under

cultivation. But a very small part of it is producing all it is capable of. In order to get the most out of the land it is necessary to work it deeply and thoroughly.

This cannot be done satisfactorily or economically without a good supply of heavy horses. Therefore, I feel justified in saying that the development of California is largely dependent on the draft horse.

In Europe, the home of the draft horse, he is invariably to be found at his best in the most productive part of the different countries; for instance the shire horse will be found at his best on the rich pastures of the Midland countries and in the reclaimed land of the Fen District. The Belgian is also largely bred in the moist pastures behind the levees and the Percheron comes from the best grass land of France.

WHY CALIFORNIA SHOULD HAVE BETTER DRAFT HORSES

In all of these countries it is considered profitable to devote a considerable part of their best land to the raising of draft horses. In California we have immense tracts of land as good as their best and a climate which is ideal for the purpose, for while we do not have the summer rains which keep the pastures of Europe green the year round we usually have an irrigation ditch or a pump at our service which enables us to apply water whenever it is required.

To sum up the situation, there is no reason why we, in California, cannot raise draft horses of as good a quality as in any other part of the world and at a cost which will enable us to compete with other countries.

There probably never was a time when the prospects for the draft horse breeder were more promising than they are at present, both for pure breds and grades. In fact, it is imperative that more attention be given to the horse business of the State. The great increase of population which is sure to come in the near future, now that the Panama Canal is open, and which will be largely agricultural, and the higher education of the people along agricultural lines will without



Salvador Forest King, champion shire stallion, California State Fair, 1914

doubt tend toward smaller farms and more thorough cultivation. This will create a largely increased demand for horses, mostly of the draft type.

The war now being carried on in Europe will have a very marked effect on the horse business all over the world. It will affect us in two ways. In the first place it will cut off the supply of breeding stock, upon which we have relied for many years; secondly, it will make a demand for horses, both for the war itself and to replace the waste when the war is over, which will absorb our surplus.

Another condition which will have its effect on the supply of the future, is the shortage and consequent high price of meat. The natural result is that ranges

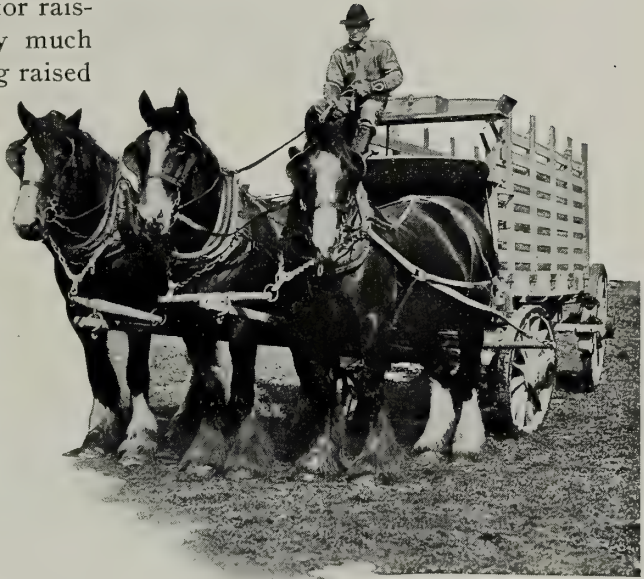


Gaer Conqueror, champion London Shire Horse Show, 1910-11

are, to a great extent, being used for raising cattle and sheep and a very much smaller number of horses are being raised on the ranges.

These conditions point to a largely increased demand during the next ten years with no corresponding increase in the supply and as a result, high prices.

There is one branch of horse breeding which has been very much neglected in this State, namely, the raising of pure bred stock for breeding purposes. Up to the present time we have depended almost entirely upon Europe for our breeding stock. Now the producing of this class of stock is one of the most profitable as well as the most interesting branch of the industry and they can be raised in California just as well as in Europe if sufficiently high class foundation stock is secured, but if this industry is to be established on a permanent basis it is absolutely necessary that we produce horses as good as the best that we can import. In order to do this it is essential that both mares and stallions of a very high standard be secured. Only a very small proportion of the pure bred mares of this State are good enough to be stallion producers. It is far better



Three imported shire mares at work

to commence with one or two first class mares than with a dozen inferior ones.

A few good, pure-bred mares will undoubtedly be a good investment to the farmer who is suitably located and understands the business, but to make a success of this branch of farming considerable capital and some enterprise are required, for the necessary breeding stock are not easy to find and when found not always easy to buy. However, the man who undertakes and makes a success of it will not only realize a nice profit but



Shire mares at Salvador stock farm, Napa, California

will have the satisfaction of knowing that he has done some real good for the State.

There is no question that the draft stallions required by California, if raised at home, could be sold at less than one-half of the present cost to the farmer and at the same time leave a handsome profit for the breeder. The high prices at which the imported horses are sold is due in part to the cost of buying in Europe, transportation, etc., but also in great measure to the unbusinesslike manner in which the farmer buys from the importer. Stallions are peddled round the country and sold on long term notes which must be heavily discounted. All this increases the cost of stallions and is an unnecessary tax on the business which would soon be eliminated if the bulk of stallions were raised at home.

The other branch of the heavy horse business, the production of mares and geldings to do our farm work and the

heavy hauling in our cities, is one which, to be made profitable on the high priced lands of California, should be done in conjunction with general farming, so that the mares will be able to pay for their feed by their work and the young stock, after three years old will also be self supporting till they are old enough to be sold. In this way a few brood mares will materially help to make the farm profitable. It will surprise many to learn that for many years California has not produced enough heavy draft horses for its own use and buyers have been compelled to go back to the Middle West for horses to work on our streets and they have paid prices for them which would have been very profitable to California farmers.

There is probably no branch of farming more profitable than the breeding and raising of high class draft horses and certainly none from which more pleasure can be derived.

FOR MANY years California has not succeeded in producing enough heavy draft horses for use in the State; and yet, such horses may be bred and raised here with the greatest success. Moreover it is a profitable and interesting industry. Here is a "word to the wise": Our Service Department will tell you where good locations for stock farms may be obtained.



Claude, Dainty, Stroller, Royal Rogue, Kenilworth, Bombardier, Military Man

The California Trotting Horse

By Will M. Neal

Editor "The Breeder and Sportsman"

Editor's Note: Mr. Neal's striking article is warmly commended by Mr. W. F. Kelly, secretary Pacific Coast Trotting Horse Breeders' Association, and it deserves it. It is a masterly sketch of the origin and development of the fast horses which have given California leadership in the United States—second only to Kentucky. Mr. Neal also cites the achievements upon which this position rests, so that one gets the whole great subject at one glance of the eye. The article is a model of condensed construction and closes with a ringing paragraph of what California has done for the world.

FROM the earliest history of the horse in California, one salient feature has stood ever to the fore, that only the best were good enough for Californians. The

Spaniards, in their occupation of the great ranges so naturally adapted to stock raising, brought with them the best of the contemporary equine families of old Spain,

recruited from the desert countries bordering upon the Mediterranean and the Gulf of Arabia and transported over seas to carry Spanish cavaliers in the conquest of their vast domain in the new world. Crowding hard upon them, generations later, came the adventurous hordes of Anglo-Saxon pioneers—fighters, gold seekers, cowmen, home hunters—a class of men in whose veins ran instinctively the appreciation of good horseflesh for what it was truly worth in frontier service and the innate love of a good horse for the horse's own sake.

The horse of the early Californian must needs be one of speed, stamina, and intelligence, so it is but natural that the initial importations should have been from the pick of what the East and Central West had to offer. Shortly came the knowledge that on California grass and grains and in her invigorating atmosphere horses developed in a gratifying manner unknown in older sections, and horse breeding, at a very early date in our history, received an impetus that carried it and has maintained it among the most important of the widely varied industries of the State. The light harness horse, the thoroughbred, the gaited saddler and the drafter, all were soon represented in the Golden State by the best obtainable individuals of their families, and while all thrived in surpassing measure it remained for the trotter to achieve the greatest and most lasting fame.

CALIFORNIA AND THE TROTTING HORSE

The development of the trotter into a distinct type from an amalgamation of the best of several breeds and families, and the progress of California from a chaotic state of semi-civilization to her present proud position in the honor roll of states were contemporary achievements, and so clearly are they linked that the history of one is as the history of the other. The "days of gold" were the days of popularity of the

Black Hawks, with Rysdyk's Hambletonian a yet unheard of suckling in the Sugar Loaf hills in faraway New York; the trotter, as we of today know him, was merely a "horse in the making," and the story of the part played by California in the upbuilding of this newest and greatest of equine houses is one of the wonder tales of her history. The men who established the trotter on the Golden Slope were the men who were ever foremost in building up the State as well, and the obstacles surmounted by St. Clair, Buccaneer, General Taylor, Rifleman, Comet, John Nelson, George M. Patchen, Jr., Williamson's Belmont and many others ran in lines parallel in nature to those adversities faced and conquered by their masters in their irresistible onward march.

From the fusion of the blood of the pioneer stock many fast and useful horses manifested themselves at an early date, but it remained until the fall of '73 for a "strictly home product" to achieve championship honors, when the brown gelding, Occident, a grandson of St. Clair (one of the original forty-niners) pulled George Tennant the full mile over the Sacramento track in 2:16¾, equaling the world's record of Goldsmith Maid, established the previous year. From that date the California trotter has remained ever in the limelight.

GREAT BREEDING FARMS ESTABLISHED

The years immediately following the performance of Occident witnessed the establishing of the first of the great breeding farms that were to draw the eyes of the world upon California—Palo Alto. For some time Governor Stanford had been breeding horses in a minor way on the Sacramento with the stallions, Monroe Chief, 2:18¾, and General Benton, but in '76 he selected Palo Alto as a more fitting location for his operations and in the succeeding year established at the head of his stud the then nine-year-old Electioneer.

The time required for the son of Ham-

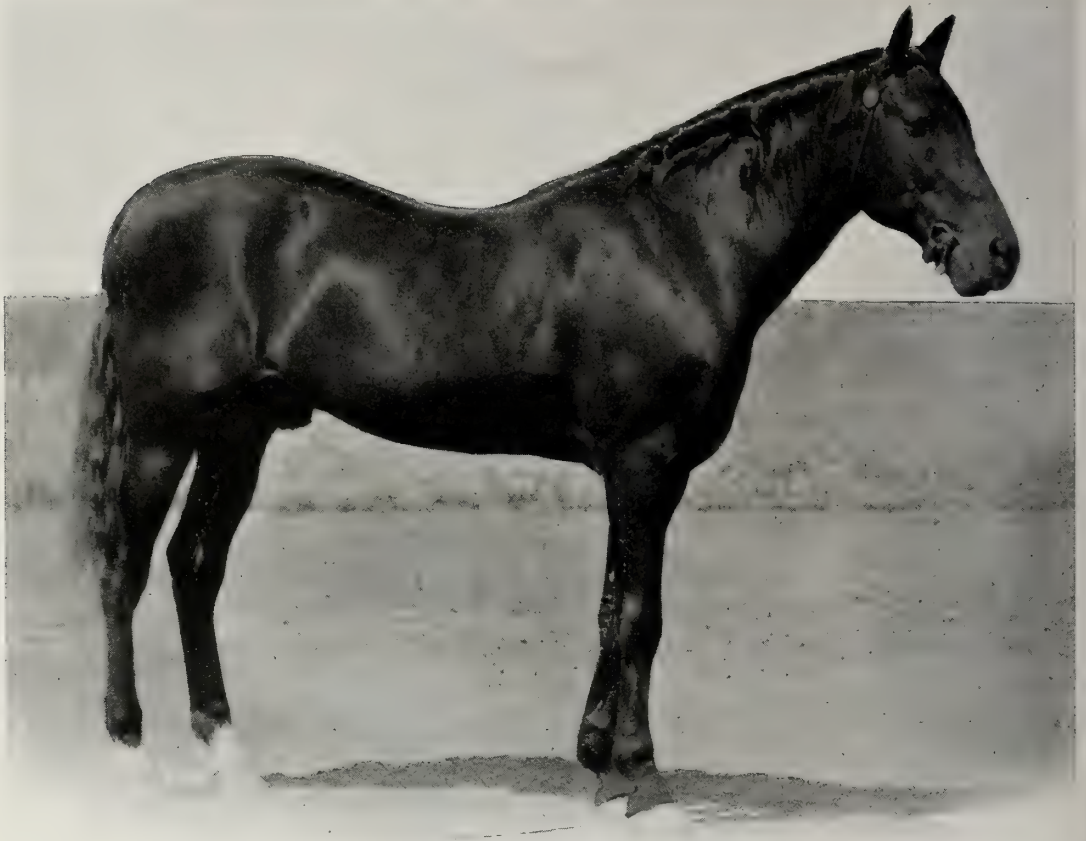
bletonian 10 and Green Mountain Maid to demonstrate the soundness of Mr. Stanford's judgment in his selection of a sire was short, for in 1880 the two-year-old Fred Crocker—forerunner of the long line of Electioneers that were to achieve at some time in their careers every trotting record of their day—burst into fame with a mile in 2:25 $\frac{1}{4}$, reducing the world's record of 2:26 $\frac{1}{2}$ made only sixty days previously by the other great California two-year-old, Sweetheart, by Sultan 2:24, bred and owned by L. J. Rose of Los Angeles. From that date the future of Palo Alto was assured, the farm's glory reaching its height in 1891 when Charley Marvin returned from his season's campaign with every trotting record in the possession of the Stanford stable. At this time the number of horses owned by Governor Stanford ran well over the one thousand mark.

But Palo Alto was not alone in California in the production of champions of the harness horse world. L. J. Rose of Los Angeles with Sultan, 2:24; William Corbitt of San Mateo with Guy Wilkes, 2:15 $\frac{1}{2}$; Monroe Salisbury with Director, 2:17, and Count Valensin with Sidney, 2:19 $\frac{3}{4}$, all were producing performers whose names figure variously in the tables of fastest records, and any number of breeders who were operating on a less pretentious scale were developing horses that, while not achieving actual championship honors, were only seconds or fractions thereof removed from the circle of celebrities and were, in many instances, proving greater campaigners and actual money winners in competitive races than the headliners themselves. California horses went to Eastern sale rings in solid trains, and everything carrying California blood lines was eagerly sought for. Then it was that the breeding of the trotter gained its coveted position among the three leading industries of the commonwealth.

Nor is it to be forgotten that while the get of these pioneer horses were at the height of their glory another family was being established on the Golden Slope, quietly but steadily; a family that was destined to exert an equally wide influence in the world of the trotter—that of McKinney, the bay son of Alcyone and Rosa Sprague, brought to California as a two-year-old in 1889 by Charles A. Durfee. The story of his house, one of the most potent and prolific of the present day, occupies one of the principal chapters in trotting-horse annals. At this time McKinney ranks as the world's greatest progenitor of 2:10 speed, almost every one of the sons and daughters appearing in the "charmed circle," having been bred on California soil, and his blood is more widely disseminated on the Coast and plays a more potent part in California's breeding industry of today than does that of any other one horse.

THE DAINTY LOU DILLON

Many times had the get of our home stallions and matrons drawn by the excellence of their performance the attention of sportsmen wherever the trotter was known, but it fell to the lot of the Golden State to achieve her most startling success in the eyes of the whole world in the way of speed production when, on August 24, 1903, at Readville, Mass., the dainty Lou Dillon (herself, her sire and her dam California-bred) settled once and for ever the long-mooted question of whether the "two-minute trotter" should be classed as a reality or merely as the product of enthusiastic and optimistic conjecture. Piloted by Millard Sanders (a long-time resident of the Western Coast, and who, a round dozen years before, had driven Frou Frou, another and earlier member of the great family of Sidney, to the then world's yearling record of 2:25 $\frac{1}{4}$), she swept to the quarter post in :30 $\frac{1}{4}$, to the half in 1:03 $\frac{3}{4}$, to the three-quarters in 1:31, and came to



Electioneer, famous head of the Stud of Stanford ranch in the early years of trotting horse breeding in California

the wire in an even 2:00, later in the same year reducing that mark to 1:58½. There it still stands as a record for trotting mares, and there it stood as a record for all trotters until 1912, when Uhlan, tracing in direct line to Electioneer, clipped the half second and established the present figures 1:58.

Though Californians have ever been partial to the pure-gaited trotter and have spent the best of their efforts to produce horses with the "one, two, three, four" way of going, the California-bred pacer has kept abreast of those from sister states most worthily. Colt records, season championships, heat records and many other laurels have fallen to them, and in a majority of the hardest fought and

fastest contests which men remember longest they have borne the brunt of the battle and emerged with honors, while from a California-bred sire has the wonderful Directum I received the speed inheritance that has made him the king of racing pacers.

WHAT CALIFORNIA HORSES HAVE DONE

Reluctantly disregarding the hundreds of horses bred on California soil, both trotters and pacers, that are spoken of daily wherever great racing deeds are reviewed, the following synopsis is presented showing those actually achieving recognition as "champion trotters" at various ages, regardless of sex classification:

Yearlings:—Pride 2:44½ by Buc-



Sidney Dillon, noted sire of the first 2:00 Trotter

caneer, 1881; Hinda Rose 2:36½ by Electioneer, 1881; Freedom 2:29¾ by Sable Wilkes 2:18, 1890; Bell Bird 2:26¼ by Electioneer, 1891; Frou Frou 2:25¼ by Sidney 2:19¾, 1891; Adbell 2:23 by Advertiser 2:15¼, 1894; Wilbur Lou 2:19½ by Kinney Lou 2:07¾, 1910.

Two-year-olds:—Sweetheart 2:26½ by Sultan 2:24, 1880; Fred Crocker 2:25¼ by Electioneer, 1880; Wildflower 2:21 by Electioneer, 1881; Sunol 2:18 by Electioneer, 1888; Arion 2:10¾ by Electioneer, 1891.

Three-year-olds:—Hinda Rose 2:19½, 1883; Sable Wilkes 2:18 by Guy Wilkes 2:15½, 1887; Sunol 2:10½, 1889; Arion 2:10½, 1892.

Four-year-olds:—Bonita 2:18¾ by Electioneer, 1883; Sally Benton 2:17¾ by General Benton, 1884; Manzanita 2:16 by Electioneer, 1886; Sunol 2:10½, 1890; Directum 2:05¼ by Director 2:17, 1893.

Aged:—Occident 2:16¾ by Doc, 1873; Sunol 2:08¼, 1891; Lou Dillon 1:58½ by Sidney Dillon, 1903.

Stallion:—Palo Alto 2:08¾ by Electioneer, 1891; Directum 2:05¼, 1893.

In addition to these horses, California trotters figure prominently from year to year in the "season championships" for all ages and sexes, over all kinds of tracks, in all localities where racing is conducted. Year after year the great families founded on the Golden Slope furnish from their

diverse ramifications the leading contestants for the premier honors of "fastest performers," or for the spoils of battle to be wrung from the winning of rich stakes. Of all the horse-producing states, only Kentucky ranks California in prestige in the realm of the trotter. To a thousand farms across the mountains and deserts to the East, to the countries of the old world where harness racing flourishes, to the breeding centers of Australia and to the islands of the Pacific where the Anglo-

Saxon has carried with him his favorite sports, California has given of her bounty in speed-producing blood until today, when champion upon champion appears, born without her confines, perhaps, but owning blood allegiance to the great houses of Electioneer, Guy Wilkes, Sidney, Director, Steinway, McKinney, Dexter Prince and others of an equally lasting though slightly lesser luster, the debt of the world to California and her horses and horsemen is incalculable.

IN JUDGING horses so much stress is usually placed upon the importance of good legs and feet and general conformation that the head, which is just as much an index to character in horses as is the face in humankind, is often overlooked. We are likely to inspect a horse from the ground upward, and though we admire a good head we regard it in the light of an additional rather than a necessary virtue.

From the tips of a horse's ears to the end of his nose, every line has some meaning well worthy of consideration. The ears are important. From the manner in which they are carried we learn not only much of the animal's character—whether he is intelligent or stupid, timid or fearless, lazy or ambitious—but also what he is going to do under various circumstances. The eye of the careful driver is never off his horse's ears for any length of time.—*Country Gentleman*.

The American *or* Five-Gaited Saddle Horse

By Hon. E. A. Bridgford

For Six Years President of Pacific Coast Gaited Saddle Horse Association

Editor's Note: Judge E. A. Bridgford has been for a generation a strong force in the building of the live stock interests of California. During the last six years of his presidency of the association named above his interest has dwelt largely with the saddle horse. Whence came the grand creature known as the gaited horse; what are his characteristic traits and qualities among other equine classes; what he means to the heart of a man and particularly to a Californian, where conditions favor the closest association, and why such a horse can never be displaced but will grow in favor—such are a few of the considerations which Judge Bridgford urges forcibly and eloquently.

THE saddle horse has been the companion of man throughout the historical age of the world, and there may be seen evidences of the same conditions in pre-historic times. No history of wars, ancient or modern, may be found except there is depicted therein the accompaniment of the horse in the great achievement of man. He has been man's greatest friend in times of war and in times of peace; in civilized and cultured communities, and on the frontier and the field of the savage. You may see the illustrious of all ages pictured as mounted upon a beautiful and fearless charger.

But we are to treat more particularly of the special breed, "the American saddle horse." He is peculiarly an American product. He has reached his greatest perfection in the Middle West, notably in the states of Kentucky and Missouri; he is not, however, by any means confined to these states. The states of Tennessee, Illinois, Iowa, Indiana, Ohio and Texas

are quite extensively interested in their breeding. California is also making rapid progress in this line.

HOW THE BREED ORIGINATED

The gaits of the American, or five-gaited, saddle horse consist of the (1) flat-footed walk, (2) trot, (3) canter, (4) rack, (5) fox-trot, running walk or stepping space, any one of the last-mentioned three being permissible as constituting one of the five. The number mentioned comprise seven gaits, but only five are required to bring an animal within the class.

The American saddle horse is no accident. He grew out of the pride and necessities of man. In the early settlement of the Middle West practically all of the means of transportation were necessarily on horseback; there were no railroads, very little staging, few buggies or light wagons—this was necessarily so. There were heavy rains at short periods throughout the year; the soil of the country was such that the highways were almost im-



Rex McDonald, Champion five-gaited Saddle Stallion of the world.—From copyrighted photo by George Ford Morris in the "Saddle Horse of America and the Morgan Horse"

possible of passage, and only in a practical way by means of horseback. This condition of the roads remained in many places until very recent years, and in many localities even to this day, so the necessity compelled people to take the back of the horse as the most convenient, safe and comfortable way of travel.

The result was that all classes, particularly the rural classes, made use of the saddle horse; women and children were no exception. Whether they went to neighboring village, to the schoolhouse entertainment, to the church—practically all went on horseback. If the family could not afford a horse for each member, then

two, sometimes three, would ride one horse. If your best girl did not have a horse, she was requested to, and not infrequently did, ride behind you on your horse. In that case she was the one to do the arm-encircling act instead of the young gentleman. Those who were in more fortunate circumstances each had their own horse. Naturally, there grew up a rivalry among the young people for the possession of the best animal. I have known families of three to one-half dozen boys each with his own saddle horse. If they were not able to buy one, then the next best thing was to raise one—and, of course, the effort was to produce the best the circumstances and judgment would admit.

I have attended country churches many times when two-thirds of the people in attendance would come on horseback. This same custom of attending church was also true of all picnics and schoolhouse entertainments.

Of the older classes of people, physicians took more pride in their saddle horses. Of course, physicians have always desired to appear distinguished, and the better and more stylish his mount, the more attention he attracted, and the more he was talked of, the better advertised. In this way there sprung up among the physicians a rivalry for the ownership of the best and most beautiful saddle horse. They paid the best prices for suitable mounts, thus creating a market for superior animals. It was not only desirable for them to have a handsome animal, but one that would carry his rider with ease, comfort and rapidity. The horse seemingly best suited to these requirements was one with a rapid walk, growing into a stepping pace or running walk; these gaits were cultivated more and more as they became known to the people. The physicians doing more constant riding than the people generally, and feeling the necessity for such gaits, bought and paid

good prices for horses with these characteristics.

The physicians also being the most prominent men of the community by reason of their supposed learning and skill, created a desire among other classes, and particularly the young men, to emulate them in the possession of the handsomest and best-gaited saddle horse.

As time went on the rivalry waxed warm—many warm discussions being had as to which had the best animal. It was necessary that there be some method devised for determining this important and mooted question. The country fair seemed to be the time and place to settle it. So \$5.00 premiums or other small amounts were offered for the best saddle horse. Many were the early mornings and late evenings occupied by the young man in the caretaking of his horse in preparation for this most important event.

THE CONTRIBUTION OF THE THOROUGHBRED

At that time the now characteristic gait, to wit, "The Rack," of the gaited horse was not known; but instead he went the "side pace." By and by some one developed a horse that went what we now call "the rack," which is the most graceful of all the gaits, and particularly of the rapid gaits. Indeed, this is the distinguishing gait of the American saddle horse. In the early days of the settlement of the Middle West there had already developed in the South Atlantic States the love for and interest in the running of thoroughbred horses, which were used for racing purposes. These thoroughbreds, as a rule, were originally imported from England, and later extensively bred in America. The other source of importation of horses was from Canada. The Canadian horse was usually the more compact and serviceable animal. Many of them had an easy pace or amble that made them sought after as saddle horses.

The source of the saddle horse may be generally traced to these Canadian mares

mated to thoroughbred stallions, or thoroughbred mares mated to Canadian stallions. Most generally, however, the sire was a thoroughbred. There was also frequently a cross of the Morgan horse, which was a trotter.

The American Saddle Horse Association adopted in 1902 as its revised foundation stock for its register ten stallions. Six of these ten animals trace to Sir Archy, or imported Diomedé, the sire of Sir Archy, while two of the remaining four trace to thoroughbreds which, if further traced, may be found also to go to the same source. While these horses traced largely to thoroughbreds, they have come to be known as a family by the name of Den-



Carolina, five-gaited Mare—General Castlemon, founder the American Saddle Horse Register, in the saddle.—From copyrighted photo by George Ford Morris in "The Saddle Horse of America and the Morgan Horse"

marks. The predominating blood of the saddle horse, as well as the standard-bred trotter, will be found to be thorough-bred. The high standard of beauty and action reached by the saddle horse has been secured by selection. The best and most noted of the saddle breed and the standard breed trace to the same source, but have been developed along different lines. As an illustration of the great interest manifested in the American saddle horse in the Middle West, your attention is directed to the fact that at least ten county fairs in the State of Missouri in the year 1914, in addition to giving many smaller saddle-horse premiums, gave a single prize of \$1,000. Two county fairs each gave a prize of \$1,500, besides a \$500 purse and many lesser ones. The state fair of Missouri gave a single purse of \$2,500, while the state fair of Kentucky gave a purse of \$3,000.

A WIDE-SPREAD INTEREST

As an indication of the interest in and value of these horses, attention may be called to some sales that have been recently made. In 1913 the stallion "My Major Dare" sold for \$10,000, and his purchaser since that time refused an offer of \$15,000 for him; "Kentucky's Best" sold in 1913 for \$7,500; the mare Hazel Dawn



California's Best at three months of age—Sired by Don Castano, champion saddle stallion of California, owned by Judge Bridgford



Le Grande McDonald at four months of age—Sired by Grand McDonald, champion of three States, and who was sired by Rex McDonald, owned by Judge Bridgford—From copyrighted photo by George Ford Morris in "The Saddle Horse of America and the Morgan Horse"

sold in 1913 for \$4,000; the gelding Jack Barrymore sold in 1914 for \$5,000. Many others might be named for which long prices were paid, but those noted are sufficient to show that the interest exists at this writing.

It is apparent that the automobile has not, and in my opinion never will, depose the high-class saddle horse. The automobile is an inanimate thing, possesses no intelligence and can engender no feeling of affection or companionship such as exists between the owner and user of a fine saddle horse and his mount.

There is nothing more healthful than horseback exercise; every muscle of the body is brought into action without effort on the part of the rider. There is a distinction in the possession or use of a fine saddle horse that does not and cannot exist in the use of a mere machine which any one with the necessary means can duplicate. It is human nature to desire something distinct. We no longer envy or ask who it is in the passing automobile; but not so with the equestrian mounted on a beautiful horse.

There are more people to be seen on horseback in the parks today than at any time in the past. This is particularly noticeable in Golden Gate Park. There are to be seen, among others, a large number of girls daily riding in this park. This not only imparts health and vigor, consequently that feminine charm, beauty, but self-confidence, grace and the recognized accomplishment of good horsemanship.

The busy American must have some diversion, some relief from the great nervous strain that is put upon him by the pressure of business. The youth of the land are encouraged now as never before in the matter of out-of-door life, entertainment and exercise. The public is going wild after baseball, and is largely interested in football, golf, polo, tennis and other outdoor sports. The interest in the saddle horse possesses a large hold upon the public, which will increase as the years go by.

IMPORTANCE TO CALIFORNIA

As an evidence of the increasing interest on the Pacific Coast attention is directed to the fact that the State fair of

California and other more local fairs are annually increasing their premium lists for this class of horses, and the exhibitions thereat are becoming more and more popular. There were some seventy head of saddle horses exhibited at the California State Fair in the year 1914, and many of the classes would have done credit in any company.

The Pacific Coast Gaited Saddle Horse Association, organized some six or seven years ago, has done much and is doing much to enhance the interest on this coast. This association is a regularly incorporated company and has established a register for the registration of properly qualified animals, and are thus encouraging the breeding of these animals. There are a number of established breeding farms in California which possess some as fine animals as may be found in any portion of the United States. The breeding of these animals, watching their development, and cultivation of their inspiring action tends to make country life more pleasing, and hence tends to encourage the movement "back to the land."

AMONG the numerous attractions of California to the visitor or resident; that of horseback riding is prominent. It is true that the automobile has captured many who were thorough devotees of the horse, but there are many who still retain their love of that form of exercise and recreation and the parks, the winding foothill roads, the valleys and the broad boulevards are sought by men, women and children with their steeds for a gallop during the hours of playtime. California has always been a horse-land. In early days the Indian, the vaquero, and the grandee were the horsemen; today the 'puncher in the cattle districts still rides like a centaur. But the love of good horseflesh is a heritage from the romantic times of California and will never utterly die no matter how persistent the inroads of the motor driven vehicle.



Fine dairy cow at Davis University Farm—Mermaiden's Fern, year's record: 9770.5 pounds of milk; 528.2 pounds of butterfat



Brown Bessie Gaylark—record: 512 pounds butterfat in eleven months. At University Farm



A splendid herd of Dutch belted cattle feeding in a field of California alfalfa. Most of the alfalfa in this State is used for dairying purposes and when used in conjunction with some concentrated carbonaceous feed, makes an exceptionally good fodder. In the circle is the world's champion cow, whose record is shown on the other side of this leaf.



CALIFORNIA COW HOLDS WORLD'S RECORD

TILLY ALCARTRA, who became the world's champion milk producer over all breeds November 13, 1914. A year's semi-official test was completed with a production of 30,452.6 pounds of milk. Tilly Alcartra is the property of A. W. Morris & Sons of California.

It is an interesting fact that not so many years ago the cow which could produce 20,000 pounds of milk in a year was regarded as a marvel. Today the 30,000-pound cow is realized in this Holstein-Friesian, whose annual production of milk exceeds that amount and contains butter fat equal to more than half a ton of butter. Tilly Alcartra thrives on the food and sunshine of the Sacramento Valley, and her record was not the result of pampering or forced feeding.

NOTE.—Dairying being one of the most important and rapidly growing industries in California, dairy experts are employed in our Service Department to supply any information required by readers of this publication.

Opportunities *in* California Dairy Farming

By Wm. H. Saylor

*Formerly Secretary California State Dairy Bureau; Publisher and
Editor "Pacific Dairy Review"*

Editor's Note: Mr. Saylor officially served the dairy industry of California for a score of years. For many years he has published the leading dairy specialty journal of the State and has recently been an owner and operator of dairy property. He is therefore broadly qualified to write a review of this important industry, setting forth its peculiar local phases, its problems, its wonderful advancement, and its outlook. He is well known not only for his intimate knowledge of his subject, but for his ability to present important and interesting considerations in a telling manner.

IT IS generally accepted that in establishing one's self in some line of business, capital is an essential. Failure in farming has particularly been credited to the fact that it is too often undertaken with a lack of sufficient capital. I want to point out that there is at least one line of industry and one part of the country where success may come, and has come in abundance where the only capital consists

of strong arms, intelligence and determination and California furnishes the theater where it can be done. In substantiation of this claim, I want to point to at least five thousand examples of its proof among the present dairymen in the State, all of whom it may be said engaged in the business at some stage with the "capital stock" above enumerated.

Let us take a typical case—it will probably



Well bred dairy heifers earn money while growing; a choice lot of two-year olds



Feeding alfalfa and other crops by the soiling system means larger yields of milk and more feed to the acre. These California cows produce better than 400 pounds of butterfat per year

be some young man just past his majority, who arrived from Portugal, from Switzerland, or possibly Denmark or Germany. This young fellow loses no time on his arrival in a new country, everything in which is strange to him except work; that he has a thorough acquaintance with and he finds it in abundance in the demand for workers on the dairy farms of California; in fact, he was sure of a job before he left the old country, and at any rate he is here but a few days when he is out in the open country—in California's sunshine—extracting the liquid sunshine from the California cows.

At the end of his first month he is handed his pay—forty dollars, and perhaps forty-five. His eyes are opened by the shining "twenties." The energy of his arms and the enthusiasm of his willing mind are being converted into cash capital. A year rolls by and he has five hundred dollars; he has it in some bank dominated by the people of his nationality where it is drawing interest with the exception of a small proportion that goes for the purchase of clothes and the few pleasures he craves aside from the satisfaction that he finds in the fact of making financial progress. He puts in a

second year and possibly a third in the same way, and likely on the same dairy farm. Then he takes stock and finds himself possessed of a fortune amounting to a thousand or fifteen hundred dollars. We will put it at three years and credit him with the latter sum.

During his employment as a milker on a dairy farm he has taken one of his brother milkers into his confidence and plans for his future. His friend, too, is likely possessed of a similar "pile" in the bank. The result of this mutual planning is a partnership backed by sufficient capital, especially by exercising their borrowing capacity—and this class of industrious young men generally have credit to buy cows and equipment to conduct a leased dairy farm on a fifty, seventy-five or hundred cow basis. Perhaps they rent from their former employer, who, seeking retirement, is pleased to turn the place over to them, for he knows them and the "stuff" they are made of. Maybe it is some disgruntled American farmer or dairyman who wants to get away from the "drudgery and bother" of running a dairy; in which case, as likely as not, the new partnership picks up a "snap."

Meanwhile the probabilities are that ro-

mance has been at work and our erstwhile young foreigner, combining good business with romance, has sent word to his old sweetheart at home to come to California and join fortunes with him, and in short she is installed as the life partner of one of the members of the firm and chief of the household department of the dairy establishment.

The fat bimonthly checks come from the creamery or city milk dealer. The "veal wagon" makes its regular visits, leaving liberal checks, while the boys go on accumulating pork; at the same time, something else is going on; the heifer calves are being raised and in a few years the original herd has outgrown the farm. Something must be done; the partners again confer and finally decide to break the enterprise into two units; one acquires a lease on another piece of property, the checks continue to come in, the bank accounts accumulate, as does also each herd. The next step has arrived and all of a sudden the local community is surprised that the Portuguese, Swiss, Scandinavian immigrant, or whatever the nationality may be, of only a few years ago, has purchased a farm and completed the transition from a poor and modest but willing

wage earner, to an employer of labor and a person of business standing in the community.

I take this course of presenting dairy opportunities in California, not out of mere fancy, but because it corresponds with facts. Go into any dairy community in the State and you find it exemplified—in fact, the dairy industry of California rests on just this line of experience. It rankles an American somewhat to admit the success of this thrifty foreign-born element. But it is true. The American youth comes to California looking for the easy, cuff-and-collar job; in too many instances he fails to land it, and while he drifts to lower strata of labor, he does it with disgust in his heart, ambition dies out, while the young foreigner finds in the humble work on a dairy farm his opportunity.

FUNDAMENTAL FACTORS OF SUCCESS

And how do we account for this success and wherein is the opportunity? I have only space in which to present a few pertinent facts. I shall leave out of discussion that portion of California known as the native pasture dairy sections, as they have already reached a fair degree of development, and confine myself to the irrigated dairy sections of the State in



Holstein cows yield from ten thousand to thirty thousand pounds of milk per year and are preferred for city milk production

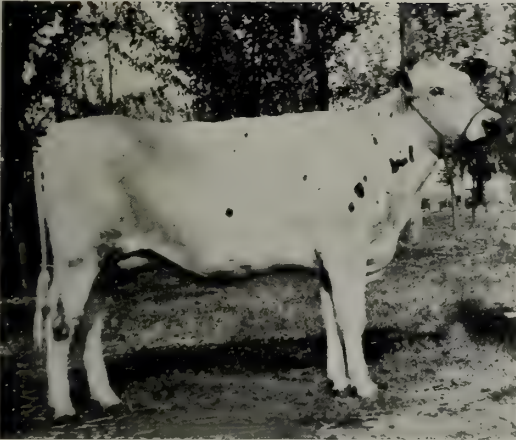


The unsanitary dairy barn is giving way to modern methods in which light, cleanliness and convenience are the first considerations

which alfalfa grows to perfection. Land by underflow through the soil yields from five to eight tons of hay to the acre, while ten tons



Restrained but as comfortable as though feeding in a meadow



A thousand dollar California heifer

one cow to the acre of a fair alfalfa yield is a liberal one. There are dairymen who keep two to the acre; there are others who use two acres or more to one cow and fail at that. Good management and a thorough understanding of soils and cropping account for the difference.

And what can the California cow do with this alfalfa? A few figures will show it. In Tulare County they have a body of dairymen who have banded themselves together to systematically "test" their cows through the medium of an official tester in order that each cow in the herds may be made to stand on



Large herds on specialized dairy farms mean efficiency and big "cream checks"

is not an exceptional yield under ideal conditions.

The scientists will tell us that a ton of alfalfa hay contains 210 pounds of digestible carbohydrates, what might be termed the refined products out of which milk and meat are made in the animal body. At five tons to the acre it means approximately 1000 pounds of digestible protein and 4000 pounds digestible carbohydrates to the acre. These same scientists tell us that a fairly good dairy cow can do good work with three pounds of the protein and fifteen pounds of the carbohydrates a day, and hence the accepted standard of



The Guernsey cow is popular in California



A co-operative creamery in California

her individual showing for butterfat production. Thirteen herds have completed a year's work with an average production of 272.5 pounds, fed exclusively on alfalfa. The statistician of Stanislaus County found that it produced 7,541,900 pounds of butter in 1913 from 30,228 cows in the county, making an average yield of 248 pounds per cow besides supplying local needs in the way of milk and cream.

Up in the Eel River Valley, Humboldt County, where clovers take the place of alfalfa, eight herds entered in the Ferndale Cow Testing Association, representing 609 cows, averaged 291 pounds of butterfat in a year.

Taking yields of individual cows, we have some striking records to show what a good cow

can do on an exclusive alfalfa ration. The best producing cow in the Tulare Testing Association referred to, a Jersey, made 437 pounds of butterfat in a year. In the Ferndale Association, one herd developed cows with yearly yields of butterfat amounting to 544, 464, 456, and 458 pounds. A cow in the writer's herd made 444 pounds of fat in a year. In fact, reports of cows yielding over 400 pounds of butterfat in a year on exclusive alfalfa feeding are numerous, and nothing can better proclaim California's claim as the ideal home of the dairy cow and the way in which she compensates for them in profits.

GROWTH OF THE CALIFORNIA DAIRY INDUSTRY

The result is shown in the rapidity with which the State has forged ahead in the dairy



Hunting the shade after a full meal



Dairy Shorthorn

business, a business that represents \$40,000,000 annual gross income to the industry. From a butter production of 28,783,859 pounds for the year 1900, it has grown to 59,286,460 pounds for the year ending October 1, 1914; butter, by the way, being the principal avenue through which the product of the cows of California is disposed of. The gain during the years shown above represents in the main the development of the dairy industry in the irrigated portions of the State.

Coincidentally with the increase in importance and extent of the dairy industry in California has been the progress in better methods, in a better and more profitable class of dairy cows and in sanitary and well-equipped dairy plants. She has models of the last mentioned and some of her breeding herds are world famous. How much our climatic and feed conditions contribute to the evolution of a better race of dairy cattle Californians are too modest to make claims. The fact remains, however, that the breeding of registered animals of the purely dairy breeds of cattle is one of the profitable and attractive features

of the business. The local demand for breeding stock has been strong, while an export demand is ready to take our breeding stock as soon as we get in a position to supply it.

With the splendid success that dairymen have made in the past in California and the rapid development that the industry has undergone, the question naturally presents itself as to the permanency of this prosperous condition and the prospects for continued profitable returns from the dairy herds of the State. The alarm about overproduction is always present with the pessimist. I heard it twenty years ago when California produced less than one-third of the butter she produces at the present time. It prevailed at a time when the dairy industry was confined to less than a dozen counties along the immediate coast, whose produce did not only supply the urban population of the State, but much of which was shipped into some of the interior counties, some of which are now producing as much butter as any two counties in the older dairy territory referred to.

California is not developing along single industrial lines. At one time it appeared as

though this might be the case, and that she would become one vast combination orchard and vineyard, and decreased returns in these lines of agricultural activity have often been pointed to as examples of what may happen to the dairy business as a result of its rapid expansion. Each decade we have seen the dairy output of the State double, but each one has also seen the consuming industries other than those strictly agricultural, incident to our apparently inexhaustible supply of mineral oil, the utilization of our vast stores of still undeveloped electric power, the expansion of our domestic and overseas commerce, developing a non-agricultural population in California that has forced the prices of staple farm products upward instead of downward.

When we have supplied the demand in California for butter we can turn to cheese production. The State still imports two pounds of cheese to every one that we produce, and fifty cans of condensed milk for every one of local production. When we have fully supplied these channels an Eastern demand eagerly awaits our supplies of dairy products. Vacant areas of land throughout the country are being occupied. The beef industry, which is so closely correlated to that of dairying, is no

longer a matter of free ranges. The smaller farms must supply the meat for the people, and the attractive prices for beef are holding development of the dairy industry in check in the big states of the Middle East, and in consequence of which the price of dairy products is approaching prohibitive figures in the great consuming centers of the East. These offer great opportunities for California dairy products. And fortunately she is able to take care of this demand at its best, which is during the midwinter of the East, where severe weather makes dairying a matter of small profits in winter, while the California cow, living in the open winter and perpetual sunshine, gives as good an account of herself during the winter months as at any other. Indeed, California can have somewhat of a monopoly on fresh-made winter butter of high quality if her people see fit to develop it. It pays to raise oranges and other fruit to ship to the Eastern markets. A carload is worth from \$200 to \$800, and sometimes there is nothing left after paying handling and transportation charges. A carload of butter is valued at from \$5000 to \$7500, and the sale of it at a distant point is bound to leave some part of it for the producer. There are in Cali-



Waiting to enter the barn to deliver the goods

fornia millions of acres of rich valley lands still waiting to be irrigated on one hand and to be drained of excessive water on the other. Barring occasional areas of land of indifferent and even inferior quality which are too often unloaded on unsuspecting settlers, these areas are ideal for dairy farming. They yield alfalfa, the incomparable dairy forage,

to perfection; in like manner corn for ensilage, root crops and other forage. Her industries offer the by-products of sugar factories, flouring mills, oil mills and breweries. For external comfort and internal nutrition the California cow is blessed above all dumb animals, and when the cow is right she responds generously to her owner.

WE LIVE in revolutionary times, peaceful here in California, but none the less revolutionary. In no line of industry has that fact been more marked than in the dairying industry. Immigration made possible alfalfa and the kindred dairy herd foods, with the result that there are probably more farmers using the sanitary separator today than used the old-fashioned dasher churn a generation back. The farmer's butter of the past has disappeared and it is well it is so, for today with the high-class products of the modern creamery, the butter of the past would find no market. The quantity has increased while the quality has risen so that today, while the consumption per capita has materially increased, the supply at last serves the local demand. With a soil and climate that produce six crops of feed per annum the price of the high-class finished product has tended downward; with a practically inexhaustible water supply, with wide areas of still virgin soil; with Alaska, the Islands of the Pacific, the Philippines, and the mainland of the Orient, for a market; with a transportation rate East via the Panama Canal, that makes it possible to send the products of early spring to the Atlantic seaboard while yet the winter snow is on the ground, the dairying industry of California has a future as boundless as the sea.

Dairy Products *from* the Cow *to* the Consumer

By Ed H. Webster

General Superintendent California Central Creameries

Editor's Note: Few men on the Pacific Coast are as well informed in the dairying business as Mr. Webster, who has studied the industry from almost every possible angle. For four years he held the important post of chief of the dairy division of the United States Department of Agriculture; a similar length of time was spent by Mr. Webster as director of the Kansas experiment station, and for two years he acted as associate editor of *Hoarst's Dairyman*, an official paper of the industry. For five years he has been engaged in the practical business department of dairying. His paper which follows is thoroughly dependable, though written in terms that any one may comprehend.

IN OUR grandmothers' day, yes in our mothers' day, butter and cheese were home-made products, and these same mothers were the dairy maids. The old dash churn and the simple cheese hoop and improvised press purchased for the price of a few pounds of butter or cheese, constituted the factory equipment. Even in our day (and we do not have to go back so very far), ranch butter and cheese made up the bulk of trade in these products. Many men still in the wholesale dairy produce business began as handlers of ranch products.

Not long ago the dairyman delivered his milk direct to the consumer. A milk pail, a can and a tin dipper made up his equipment. Because the milk soured quickly he made two deliveries a day.

In those days the cream separator and the Babcock tester were unknown. Milk would sour then as now but a passing thunder shower and hot weather were supposed to be the contributing causes. No one knew anything about bacteria or microbes.

The evolution in the dairy business has been marked by an almost complete abandonment of the old methods and ideas and the substitution of the factory for the manufacture and distribution of all dairy products. The farmer no longer sells butter and cheese, but takes his cream to the creamery and his milk to the cheese factory. The milkman who now leaves the bottle of Pasteurized or certified milk at the consumer's door is not the farmer, but the agent of a great milk plant, which gets its supplies from the farmer at wholesale.

Because of these changes we have today, butter and cheese of uniform quality and milk that is rendered pathologically safe by Pasteurization and produced under modern ideals of sanitation.

The modern creamery or butter factory buys the raw material from the farmer in the form of cream. This cream must be clean and in good condition or it can not be made into fine butter. The amount of butterfat in the cream is determined by the Babcock test and

the scales, and the farmer is paid a price proportional to the price of butter in the wholesale markets of San Francisco and Los Angeles. The price for a pound of butterfat varies from 2 to 5 cents above the wholesale price of a pound of butter.

The cream, in the best factories, is Pasteurized, that is, heated to a temperature which will destroy most of the bacteria which it contains, and cooled to the churning temperature.

The modern machinery and appliances for this work are the marvel of the novice and the despair of the old time butter maker. But the processes used insure a healthful and fine butter of uniform quality. The butter maker in such a factory must know how to make fat, salt, moisture, and acidity determinations, all of which are the application of chemistry to his work. He must be a good judge of the quality of cream and butter and know enough plain arithmetic to calculate his results and bring his computed work to a uniform standard of quantity and quality.

California has some of the most complete and down to date butter plants and some of the most expert and skillful butter makers to be found in the country.

Sixty-seven million pounds of butter were made in the State in 1914, but not all of it was of the high quality above mentioned. There are too many old-fashioned butter makers and too many poorly equipped creameries. No state in the Union can produce butter more cheaply nor is any other great butter state better situated for reaching the great markets on the Atlantic seaboard than California. By way of the canal we can put butter in New York, Boston, Philadelphia, Baltimore, and Washington at less cost than any of the great Central butter states. Our opportunity lies in producing the fine quality demanded by these great markets. California is destined to become the greatest butter producing center in the whole world.

The cheese industry of the State is still in the stage of evolution between the ranch and the factory. Some of the finest cheese is made in California. We have great opportunities

along that line but the crude methods must give way to the more modern cheese factory and the skill that can be there applied in the manufacture of a uniform high quality.

Not many Californians are aware of the fact that we have in this State the largest dry milk factory in the United States. Dry skim milk is rapidly becoming a standard article in the home, the bakery, and in many food manufacturing concerns. The California product is sold throughout the East and South in direct competition with Eastern manufacturers. The output of this product in the State now amounts to 2,000,000 pounds per year, with possibilities of great development. The product is from pure skim milk and is so perfectly made that the addition of water to the dry powder brings it again to the form of skim milk. Only an expert could tell it from the original article from which it was made.

No branch of the dairy business has gone through so great an evolution and has so changed for the better as the distribution of market milk. The days of the dipper and can have forever passed in California. City and State inspection compels clean, sanitary barns and handling on the ranch. Nearly all of the large milk plants now have complete Pasteurizing apparatus which enables them to put out a milk which may be guaranteed to be free from disease germs.

Large centrifugal machines are used to clarify the milk. These machines remove any sediment or solid particles that may be in the milk and which in fact are normal to all milk but not necessary for its purity as food value. The milk is then heated to 140 degrees Fahrenheit for twenty-five minutes and then cooled to less than fifty degrees Fahrenheit. This heating and cooling, called Pasteurization, destroys all possible disease germs which in spite of the most careful watchfulness may enter the milk from the clothing or hands of the milkers or from the udder of the cow, and destroys also most of the other bacteria which are present in all milk a few hours old.

The rapid and complete cooling keeps any organisms not destroyed from developing. Such milk is absolutely safe for drinking by

babies or older children. The present day method of distributing milk is in sterilized bottles. Milk properly Pasteurized and placed in such bottles and tightly capped will, if kept cold, remain a perfect food for many hours. It can be safely asserted that the milk supply so handled is a much safer food for children than that obtained in the smaller towns where the expense of modern milk plants is not a commercial possibility.

Thus has the dairy business of California developed from a farm to a factory proposition and in such development the producer and the consumer are better served. It has removed much hard work and drudgery from the shoulders of the farm women and at the same time furnished the women of the State purer, more dependable, and better dairy products.

By this means alone has it been possible to build up a great dairy industry in California. As great as the industry is at the present time it is still in its infancy so far as the possibilities of development are concerned.

In the rapid growth of our population and the varied industries of our State, dairying did not keep pace with other developments until

within recent years. The result was a shortage of supplies for home consumption and because of our distance from other dairy centers, high prices for all dairy products were the rule. They were much higher than in Eastern markets.

With the wonderful development of the past six or eight years, however, we have reached a point where we have a small surplus of butter, and as a result lower prices rule than formerly. We are just at the transition stage in this respect. There is as yet too little surplus of butter to establish permanent and regular trade with the great Eastern markets. As a consequence our prices rule lower in proportion to Eastern markets during the summer, the period of our greatest production.

With enough surplus product to establish such trade channels, however, California stands on better ground than any of the butter states of the Middle West.

The temper of the California people to do things in a big way will be exemplified in dairying as it has been in fruit growing and general ranching. The future looks good for the dairyman and the establishment of a greater dairy industry is well under way.



Holstein Friesian Cow



Dairy school class, 1914

Dairy Instruction at the University Farm

By Prof. H. E. Van Norman

*Vice Director and Dean of University Farm School at Davis, Cal.,
and President National Dairy Show*

Editor's Note: His position as vice director and dean of the University of California farm school fits Professor Van Norman most excellently to write upon the subject of dairy instruction. The importance of the industry to this State renders particularly interesting any information upon what is being done to educate the people in the most modern and successful methods of dairy farming. Professor Van Norman shows why the development of the industry is a necessity.

THE rapidly increasing amount of land being brought under irrigation and the cultivation of alfalfa, make the development of the dairy industry of the State of California an economic necessity, to say nothing of the increasing market for dairy products, especially ice cream and market milk, as the population of the State grows.

The competition of products from outside the State, notably butter, from across the Pacific, makes it imperative that the quality

of California's products shall be of the best. When the product is scarce the buyer is not critical, at least not as critical as when the market is generously supplied and he may choose the best.

The instruction facilities provided by the State at the university farm at Davis are planned to assist the practical dairyman in more successfully overcoming the difficulties to be met with in ordinary practice, and to attain that excellence of product which commands



Butter making at University Farm

the highest price in the face of competition. It should be borne in mind that only the best product can be shipped across the continent, or across the Pacific. Therefore, the nearby creamery or dairy, face to face with foreign competition, finds only the best quality to com-

pete with. To make the highest quality requires an understanding of principles, and a control of conditions. It is to supply this knowledge, together with sufficient practice to make it clear, that the instructional work and equipment at the university farm are planned.



Separating milk and washing utensils at University Farm



Making ice cream at University Farm

This plant comprises a ranch of nearly 800 acres, part of which is devoted to investigational and educational work, with fruits and crops, while the remainder is producing feed for the herds and flocks.

The dairy herd includes excellent groups of the leading breeds, notably Holsteins, Jerseys, Guernseys, and a few Ayreshires; also some grades in feeding experiments. Excellent individuals are to be found: Pietertje Bloom, 66816, has a record of 23,591.2 pounds of milk, and 783.35 pounds of butter fat; Colantha Fourth's Lad Mercedes, a four-year-old heifer, has a record of 17,126 pounds of milk, and 611 pounds of butter fat. These are all Holsteins, while the young Jersey cow, Mermaiden's Fern, has produced 9,770.5 pounds of milk, and 528.2 pounds of butter fat; and Brown Bessie Gaylark has produced 500 pounds of butter fat, and has several weeks to go before completing the year.

A creamery building, equipped with the latest apparatus for the churning of butter, making ice cream and cheese, together with

the testing of all kinds of butter products, is available for instruction and investigation. The cream or milk from some eighty ranches is regularly brought to this creamery, so that every day there is available material for student practice. When the students are not there the regular employees and instructors perform the work, thus the students receive instruction from men who are in daily practice in the actual handling of dairy products. During the present fiscal year something over \$60,000 worth of butter, ice cream, cheese, milk, etc., has been sold.

DIVISIONS IN INSTRUCTION

The instructional work may be divided into three classes—that for the university farm school students, young men who are eighteen years of age or older, and who may not have completed a high school course, or otherwise not fulfilled the requirements for admission to a college course in agriculture, yet are too old to go to high school for further preparation. To these men is offered three years of training in agriculture, with an opportunity to de-

vote their attention chiefly, either to horticulture or live stock, or to dairy work.

In the second group are the students who, having completed two and one-half years in the regular courses of the college of the University of California, come up to the university farm for that training in agricultural subjects which requires for its most efficient practice the use of the creamery equipment, the herds and flocks, the poultry, the swine herds, the orchards, and the fields.

The third group are the short course students who come for six weeks in the fall. These are divided into two groups—those who are preparing themselves to go into commercial creameries as helpers or foremen, and those who are going out on the ranches to handle the herds, produce milk for a creamery, cheese factory or the city milk plant, grow grain, stock or fruit.

The relatively large proportion of students of the farm school who have devoted much attention to the dairy subjects in the few years of the school's existence is evidence of the

widespread interest in this line of farm business and educational work.

Correspondence courses dealing with dairy productions are also offered, and are being taken by a large number.

At stated periods the butter makers of the State are invited to send in samples of their product for examination by commercial judges with criticisms and suggestions for improvement by members of the staff of the dairy division.

Some forty-odd butter makers took part in these scoring contests during the past year. Those who completed the year participating in every contest, received a certificate of merit for proficient work. Nearly half of those participating this year took part in one or more preceding years' contests.

The greatest need of the dairy industry in California is pure bred sires at the head of the herds, together with the use of the scales and the lead pencil, to the end that we may have more and better cows, and that more attention be paid to the handling of the product.



Dairy Manufacturers 1911—California Dairy School

SUPPLY AND DEMAND



RE you aware that California, despite its large output of poultry and eggs — amounting in money to \$18,000,000 a year, approximately — has never produced sufficient quantities of either to supply the demand?

THAT IS WHY EXPERTS DECLARE THAT “CALIFORNIA OFFERS A WIDER AND MORE INVITING FIELD FOR FUTURE DEVELOPMENT IN THIS BRANCH OF AGRICULTURE THAN ANY OTHER STATE OF THE UNION!”

THERE is not a section of the State where healthy and thrifty poultry cannot be produced. This includes the sea-coast, the so-called desert sections, and the mountainous districts.

We Need More Eggs and Therefore More Chickens

TO meet the growing demand, there must be an adequate supply. California should not be compelled to draw upon other sections of the country for that supply. And it can be truthfully said that for anyone who wishes to make a pleasant and comfortable living, with possibilities for development, there are few businesses superior to poultry culture—in California.

Our Readers' Service

has a staff of expert poultrymen who are ready to answer any of your questions concerning the poultry industry of this State. You are invited to make use of this service, whether you are already a resident of California or whether you are living elsewhere; whether you are already in the poultry business or merely contemplating going into it. Address:

**READERS' SERVICE
CALIFORNIA'S MAGAZINE
NEW CALL BUILDING
SAN FRANCISCO**



Modern Poultry Yards at Hopland Stock Farm, Mendocino County, California, showing the perfect sanitary conditions which make this perhaps the best equipped poultry farm in the State. It is ninety-eight miles from San Francisco on the line of the Northwestern Pacific Railroad.



The Poultry Industry *in* California

By George H. Croley

President Federated Poultry Association of California

Editor's Note: Few men are so well and widely known in connection with the beginnings and wonderful development of the poultry interests of California as is Mr. George H. Croley. He has been in close touch with both production and trade for more than forty years. He knows the fanciers, the large scale specialty producers of fowls and eggs, and those who are growing poultry products on mixed farms. Beyond this he knows California conditions under which all have done their parts in building of the great production which is now realized. His article is a clear picture of the industry in its present phases and the opportunities it offers.

IN COMPILING the following information we have made an earnest effort to place before those who may be considering the raising of poultry in California, as a business or as a side issue, an honest and simple statement of conditions as we find them at the present time, and if given careful investigation

by any interested reader will result in his finding nothing overrated; in case of error it will be found on the side of conservatism and not in the column of exaggeration.

MAGNITUDE AND ECONOMIC VALUE

The various reports that we have been able to obtain indicate that the commercial value

of poultry and eggs produced in California is about \$18,000,000 per year, based on the price paid to the producers, but we believe that if exact figures could be obtained it would be found to be in excess of this amount.

In some districts of this State nearly all the poultry product is marketed locally, each section having some peculiar method of distribution which renders it difficult to obtain statistical returns, and no doubt for this reason they are scarcely considered in the reports we use in making our estimate, notwithstanding they are rapidly becoming important poultry centers.

For the entire United States the estimates of the amounts paid to the producers of poultry and eggs reach the vast sum of \$1,040,000,000 annually.

It is claimed that this return is greater than the initial revenue from any other one industry or single agricultural product of this country except Indian corn.

Notwithstanding this great direct return to our poultry raisers we should, in computing the importance of this branch of agriculture, take into account certain economic benefit rendered to the commonwealth and which gain can not satisfactorily be expressed in figures.

To illustrate: We have no means of estimating how many men and women in the United States make the production of poultry an exclusive business, but there must be many thousands of them, while the industry affords partial employment to over 5,000,000 people. And because of peculiar conditions surrounding many of these persons they find in this particular outdoor industry the only avenue of employment open to them. A very large part of this sum furnishes the sole income of a very large number of these people and renders them contented and partially or wholly self supporting. It enables them to maintain their ambition and self respect because of this opportunity to remain welcome and useful members of the community and who would, if deprived of this means of earning their share of this money, become dependents, a burden instead of a benefit to the State.*

It is particularly essential that we consider these factors as of genuine importance for the reason that it is now deemed the duty of the people as a whole—the State—to save waste and use preventive measures to avert poverty and delinquency as well as to correct and punish; therefore, this industry should be of sufficient ultimate value to the people of every commonwealth to warrant the constant and systematic attention of all state governments. It is the duty of the community to more or less supervise the conduct of this scattered but peculiarly beneficial branch of agriculture; to gather and disseminate reliable, concrete information and advice; to encourage these small producers and endeavor in every proper way to assist them to help themselves, thus preventing failure on their part.

In defense of our contention we particularly refer to a foregoing statement regarding the importance of poultry raising to a very large number of individuals to be found in many towns, but more particularly in every rural district who find in poultry raising their only available source of employment.

Furthermore the poultry industry is largely maintained with what would otherwise be more or less waste. Much unsalable product of the farm is valuable for feed. But it is not only a source of direct wealth and economy; it is also the medium of salvage and redemption in more ways than one. At times it supplies the means to forestall the foreclosure of a mortgage, saves the farm or homestead and thus prevents ensuing poverty. The orchardist many times tides over the barren period between tree planting and paying crops with poultry, and frequently continues to jointly conduct both businesses permanently. By keeping even a small flock the housewife and children on the new farm, that is as yet only sufficiently developed or equipped to yield a bare living, are able to secure many little necessities and comforts or educational advantages that otherwise they could not enjoy, and the help thus afforded these individuals in

*We include in this statement those who are engaged in breeding rabbits, bee-keeping, etc., as well as fowls and pigeons.

some remote way benefits every member of the community.

Many other similar examples could be cited to emphasize the importance of this branch of agriculture to the people of the State at large, whether viewed from the standpoint of sociological benefits or direct commercial gain.

As a further direct benefit to society we might state that many boys find in the poultry business on a small scale the opportunity to begin a useful business career. Hundreds of our self-made and prosperous men in California owe their success and important positions to the experience and primary commercial schooling secured by them, as boys, in the breeding of fowls, to say nothing of the mischief they may have escaped because of their application to an interesting and profitable little business—all their own.

Owing to this peculiar distribution of beneficial influences among a class so urgently requiring them we believe that, fundamentally at least, poultry raising is the most important industry in America today and that California

offers a wider and more inviting field for future development in this branch of agriculture than any other state of the Union.

THE BEST LOCATION

Poultry raising has now been sufficiently tested in every section of California to demonstrate that it is possible to produce healthy and thrifty fowls in any part of the State. In this statement we include the extreme sea coast along its entire length of nearly one thousand miles of actual shore line; the so-called desert sections, as well as the Sierra Nevadas, up to 5000 feet, which is about the limit for agricultural efforts.

It is therefore only necessary for the prospective poultry raiser to investigate the possibilities of economically marketing his product and obtaining equipment and provisions for the fowls at reasonable cost in order to determine his selection of a location. It is the existence of these favorable conditions that has caused the growth of the industry in the districts which supply the poultry products of the State at the present time.



Three thousand baby chicks one and one-half days old ready for shipment

POULTRY DISTRICTS OF CALIFORNIA IN THE ORDER OF THEIR IMPORTANCE

THE following classification and brief description of the present poultry districts, in the approximate order of their importance and value of product, should enable the reader to form a fair idea of the distribution of the industry at this time and the opportunities for future development.

1. Petaluma District, including Santa Rosa and Sebastopol.
2. California south of Tehachapi—Eight counties.
3. Hayward-Livermore, including the suburbs of the city of Oakland.
4. Santa Cruz-Watsonville-Salinas.
5. San Jose-Gilroy-Hollister (Santa Clara Valley).
6. Sacramento-Stockton.
7. San Joaquin Valley, excepting that portion included in district No. 6.
8. Sacramento Valley, excepting that portion included in district No. 6.
9. Sonoma-El Verano-Napa.
10. Santa Maria-Arroyo Grande.
11. Martinez-Concord-Walnut Creek (San Ramon Valley).
12. Northwestern Coast District.
13. Northeastern Mountain District.
14. Eastern Mountain District.

PETALUMA DISTRICT

PETALUMA claims to be the greatest poultry center in the world and this is no doubt true when measured by the number of fowls for each square mile of the district, which occupies a small area in comparison with most of the other sections mentioned above. This tendency to concentrate is due to the desire to get as closely as possible to Petaluma, which is at the head of navigation on the Petaluma River only thirty-seven miles north of San Francisco.

It is also on the main line of the Northwestern Pacific Railway and the terminus of the Petaluma and Santa Rosa Electric Railway system. These railways with their branches afford rapid and modern passenger and freight service, while the water transportation supplies cheap freight service to and from a very large portion of the central part of the State. This is a very important consideration as the great bulk of the poultry food is shipped to this district from San Francisco or from those portions of the State that are reached by boats

or barges. Two steamers which make daily trips between San Francisco and Petaluma carry passengers and freight and seldom sail without full cargoes. A number of smaller power craft, sailing vessels, and flats, are also permanently employed between these two ports.

This cheap and frequent water service also makes the cost of marketing the eggs and poultry nominal. A single case of eggs can be shipped to San Francisco and the empty case returned for a charge of only 15 cents, and in large lots as low as $4\frac{3}{4}$ cents per case, while a crate of fowls costs but 30 cents, including the return of the empty crate.

Petaluma has every benefit of climate, soil and water for poultry production and several other stimulating factors influenced the growth of the industry, but even with all these encouraging features it would never have become the great poultry center without the advantages offered by cheap transportation and easy and quick communication with the great markets.

We might use the entire space allotted to the

poultry division of this publication with matter pertaining to Petaluma and not include half that could be said regarding the "Egg City," but so much information has been so widely published regarding this section we will let these few statements serve to illustrate the importance of this district.

SOUTHERN CALIFORNIA POULTRY DISTRICT

IN SOUTHERN CALIFORNIA the poultry industry has not as yet assumed the degree of concentration that exists in certain districts in the northern part of the State, nevertheless the tendency to cluster is very marked and becoming more so, influenced by advantages of markets, favorable climatic conditions, and the further benefits beginners secure by their proximity to established poultry ranches. Throughout the eight counties comprising this district the various centers of population now have their established poultry sections which supply the home demand for eggs and poultry as far as possible and during the season when there may be an over-production, ship their excess to the city of Los Angeles which is always ready to take any of the surplus products.

There has been much dissatisfaction, however, with the manner of establishing market quotations, at least during a part of the year, for the reason that during the winter months the local supply of ranch eggs in all these sections is so inadequate to the demand that none of this grade reaches the Los Angeles exchange, and the traffic is confined entirely to storage and imported eggs, while the published quotations indicate that local fresh ranch eggs have been included in the trading. These ambiguous reports and artificially created prices are misleading because the highest quoted price is accepted by the public as the proper and official value of the choicest fresh ranch eggs and tends to unjustly influence the price of this grade in the outside markets which absorb all of the product during the winter period and this misunderstanding often results in the poultry raiser receiving much less for his eggs than they are worth.

In order to distinguish the fresh from the

storage and imported eggs; to secure an established correct quotation daily, thus securing full protection for the winter home product, the leading poultry raisers have taken steps to form an association which will furnish the exchange with the product from about 200,000 hens daily. Each member of the organization will pledge a certain percentage of his output to go toward the required amount. This supply will create a new grade of eggs for quotation by the exchange and will materially assist in protecting both consumer and producer. It will also be the object of the new association to secure such legislation as may be necessary to protect the industry and also to make prosecutions for violations.

The above facts should be proof to any one contemplating establishing in this field, that this industry is far from being overdone in the South and that with this improved method of rendering quotations, the opportunity for profit is enticing.

The poultrymen of the southern district deserve great credit for the practical manner in which they keep in touch with one another and benefit by educational co-operation. They fully realize the necessity for protective organization and their efforts in this direction place them ahead of any other large section of the State.

It is claimed there are seventy-six standard breeds raised in Southern California. Many large varieties possessing fine table qualities are in favor, while in most all other parts of the State a larger proportion of smaller fowls are kept—chiefly for eggs.

The industry is making a steady and healthy growth and shipments of Eastern poultry products are as steadily decreasing.

A very large percentage of those who take up this branch of agriculture with little or no previous experience are successful, due no doubt to the spirit of unity and helpfulness that is universally prevalent in that district.

San Diego, at the extreme southwestern, and Imperial Valley, at the extreme southeastern portions of this section, are to a certain extent separate and distinct from the remainder, but the same general conditions exist. In fact,

local opportunities or beneficial influences of one sort or another make almost any settled part of Southern California a good location for poultry raising on a small or moderate scale if not as a regular or exclusive business.

Comments by an Expert—The above description of Southern California conditions was submitted to Mr. A. R. Jackson of Long Beach, the well-known engineer and expert on feed values, and who is also an experienced and successful poultryman. His report and answers to several general questions follow:

Description of territory adapted to the industry is correct as given except that attention should be called to the fact that even in the same district some locations are preferable, depending upon sunny exposures, shelter from wind, drainage due to soil and topography.

While it is perfectly possible to successfully raise poultry on a heavy soil, it is easier to keep a looser soil sweet and pure and with less attention and expense. Sandy soil is not advisable owing to the possibility of the presence of fleas, which are very detrimental, especially to the young stock.*

Has California Poultry Industry Great Opportunities?—At the present time the poultry industry offers to any individual who thoroughly understands the business or to any one adapted to the industry who is determined to succeed, the highest possible returns on the capital invested.

There is a large importation of poultry and eggs annually which in itself is sufficient argument against a possible immediate overproduction.

Furthermore it is one of the few industries that will pay interest on land worth a thousand dollars per acre, and in certain sections, in order to secure all the advantages offered by proximity to market and cheap transportation of feed and products, are located poultry farms on land of even greater value.

Like any other industry, it must be properly financed before undertaken, as a large percentage of the failures are due to the failure to recognize this fact.

What Advantages Has California in Climate?—There are decidedly no disadvantages and everything is exceptionally favorable in the matter of climate for poultry raising, as an equable temperature must be maintained whether natural or artificial for the best results in the industry, and this temperature can be maintained at a less cost for heat under the equable climatic conditions existing in this State.

What Advantages Has California in Production of Poultry Feed?—Experimentally it has been determined that a constant supply of natural green feed has given a substantial percentage in added egg production above parallel tests wherein no green feed was employed.

With little effort it is possible to secure an all-year supply of succulent green feed.

The most valuable poultry grain products produced in California are barley and the various

members of the broom corn family, of which Egyptian, Kaffir and Milo Maize are some. All these grains have a very uniform analytical value in protein and carbo-hydrates. Tests demonstrate that, on an average, slightly better than 8 per cent of the total weight of these grains is digestible protein and about 65 per cent digestible carbo-hydrates, thus putting these grains in the class with high fuel value or the nearest substitutes for Indian corn, than which, when used in proper proportion, no more valuable grain exists. The Indian corn raised in California on the average is not of as high a quality as that imported from the corn states of the East, and as the price of Indian corn has been very high for the past two years the State is fortunate in having a local supply of grains that are almost perfect substitutes for corn and may be obtained on the average at a much less price.

Oats, another of the grain products of California, finds its greatest use to the industry of poultry raising in its value as a feed for growing stock. Oats have a high digestible protein content, averaging above 9 per cent, and a carbo-hydrate value of only 45 per cent, thus making them an ideal tissue builder and non-fat producer, which is just the combination ideally suited to growing stock. Their fuel value is too low to use in large quantities for laying stock, especially in winter.

Better wheat is shipped to us from other parts of the Pacific Coast than is raised here.

HAYWARD-LIVERMORE DISTRICT

THE complete history of the rapid and surprising growth of the Hayward-Livermore poultry section would read like a romance. Lack of space forbids little more than brief mention of this fact.

The writer well remembers his first visit to Hayward thirty years ago. The little city had reached the "parting of the ways." Until shortly before it had been the clearing house for the grain and hay crops of that section, but constant cropping had reduced the yield and new methods of transportation had diverted the limited production to other centers or markets. Even the brick grain warehouse had toppled over from evident lack of support. Business was certainly dull. So far as commercial activity is concerned it resembled a Scotch village on a Sabbath morning.

We visited the section in the capacity of what might be termed a "poultry missionary," and like all advocates of something strange but better, received little encouragement.

We particularly remember pointing out the evident possibilities of the Castro Valley as a favorable poultry section, but the natives were

*These poultry fleas can be quickly destroyed by spraying the premises a few times with a solution of one gallon of common salt in four gallons of water.—Susan Swaysgood in "California Poultry Practice."

equally positive it would "never do for chickens." They said, "Why, even the soil is natural poison to hens." At present, however, the entire valley is mostly chickens and the land has increased in value from ten to fifty-fold according to location.

It was a warm day in July and after an inspection of the "valley," being tired and hungry, we were attracted by a sign, "Meals at All Hours," attached to a small cottage located under an immense shade tree in a large yard at a point that is now the center of the business section of the city. Not wishing a heavy meal we called for two poached eggs and a cup of tea. The old lady who enjoyed the combined title of proprietress, cashier, head waiter, and chef, appeared rather stunned but managed to say, "I have only one egg and that's all there is in this town, but you can have it if you will take it scrambled." We did.

It was a number of years before the poultry industry became much of a real business in that district, but when once started the growth was rapid and permanent.

At present the Poultry Producers' Association maintains in Hayward a central poultry food warehouse and egg receiving station equipped with all conveniences, including a railway spur track. It supplies feed to members to the extent of about \$150,000 per year. In addition several merchants make the sale of poultry feed and the handling of eggs their chief business.

As a further means of illustrating the present magnitude of the business in this section we might state that a large motor truck labeled "Three tons of eggs from Hayward for (name of consignee), Oakland," may be seen daily traveling along the main avenue between Oakland and Hayward. And this is only one of a number of means used to transport the eggs to the various markets.

This district is on the main line of the Western Pacific railway and is also served by several branch lines of the Southern Pacific company. Boat landings on San Francisco Bay afford water transportation. Hayward is also the terminus of the main interurban elec-

tric line of the Oakland Traction Company, while the Hayward branch of the Southern Pacific interurban electric system is now completed nearly to San Leandro, which is included in the Hayward district.

What we have stated regarding Hayward applies practically to Livermore and the territory between. As one of the oldest inhabitants puts it—"it's chickens all the way from Hayward to Livermore, but they are mostly at both ends."

The climate of this district can not be surpassed for poultry raising and comfort. Beginning at the bay shore of Richmond, West Berkeley, Oakland, and Alameda, which have seaside summer resort conditions, the temperature gradually rises until at Livermore, only forty-five miles distant, it is almost semitropical.

SANTA CRUZ-WATSONVILLE-SALINAS DISTRICT

THE Santa Cruz-Watsonville-Salinas district is one of the very latest sections to quickly grow from a moderate to a large producer of eggs. It is only during the past two or three years that it has progressed from eighth to fourth rank as a poultry center, and if it can keep up its present stride will outrank Hayward by the end of another two or three years, unless the Alameda County people increase their speed.

This is one of the sections that owes its present growth to cheap water transportation and nearness to markets. Santa Cruz is a seaport served by coasting steamers, while Watsonville and Salinas are not directly on the coast, but receive water freight by steamers to Moss Landing and a short rail haul.

The Santa Cruz end of this district is growing more rapidly than the southern portion, owing to the advantage of cheaper freight on feed from San Francisco.

This part of California is also served by the Pajaro Valley railway and the Southern Pacific company—that part of the system known as the "Road of a Thousand Wonders."

The distance by the shortest route between San Francisco and Santa Cruz is eighty miles. It also has the advantage of interurban elec-

tric railway service for a short distance down the coast.

Santa Cruz, Seabright, Capitola, Del Monte, Monterey, and Pacific Grove, all located on Monterey Bay, are famous summer resorts, and to a certain extent winter resorts, and naturally great quantities of eggs and fowls are consumed by visitors. The bathing season, which draws a greater number of people than the winter attractions, continues here for a much longer time than in the Eastern states. Owing to the tempering sea breezes and occasional fogs it has a spring-like climate during almost the entire year. These are also the factors that permit of the production of berries of various kinds during the greater part of the entire twelve months of the year.

SAN JOSE-GILROY-HOLLISTER DISTRICT

THE Santa Clara Valley was one of the first sections in California to undertake poultry raising as a real business. Originally most of the poultry farms were located near San Jose, but during the past ten years the business has spread over the entire valley until the industry reaches up the peninsula to San Francisco and south well into San Benito County. And it is steadily growing in volume.

The climate, soil, and favorable location for markets encourage the farmers to produce a very great variety of crops, and many of them find most of their time and efforts absorbed with orchards producing assorted kinds of fruits. For these reasons the attention of county folks is in many instances drawn away from the poultry business, otherwise this district would hold a still more important position.

This section is particularly noted for the great variety of standard bred fowls that are reared in large flocks. Excepting Southern California, in the other parts of the State, poultrymen of each section more or less concentrate on one or two breeds.

In the Santa Clara Valley one may see, in nearly every neighborhood, from half a dozen to forty pure bred varieties, each in a separate flock, and usually only one variety on each place.

This district is served by the main coast lines of the Southern Pacific company and a number of branches beside a very complete interurban electric railway service.

In many respects the conditions surrounding the poultrymen of this section more resemble Southern California than any other part of the State. Fowls may be successfully and profitably raised anywhere in the valley, and much of the product is marketed locally at top prices.

SACRAMENTO-STOCKTON DISTRICT

IN THE Sacramento-Stockton district we include most of that part of the State east of the Sacramento and San Joaquin rivers and thirty miles north of Sacramento city and fifty miles southeast of Stockton. This may seem a more or less arbitrary separation from the other interior districts, but from a commercial point of view it is correct for the reason that most of the poultry products of this section are handled by the large towns and cities in that interior region of the State while the trade of the divisions we term Sacramento Valley and San Joaquin Valley districts are handled locally or through the large coast cities.

Conditions under which poultry raising is conducted in this district are very diversified. This applies to varieties of climates, ample or sparse transportation facilities, in the various parts as well as to other local factors, particularly in the foothill portions. In some parts very few fowls are kept, while in others there are quite important poultry centers.

The average cost of feed in this section is very reasonable because much of it is produced in that section. One locality south of Stockton produces nearly all of the sunflower seed used as poultry feed on the Pacific Coast, hundreds of acres being devoted to this crop.

Taken as a whole this district offers many opportunities. In the way of climates, excepting that of a seaside summer resort, one may find somewhere in this section, a mate for that of almost any part of the world. A very large portion also enjoys remarkable transportation facilities embracing the most

modern interurban electric and steam railway lines, among them three transcontinental systems, Western Pacific, Southern Pacific, and Santa Fe, as well as many wonderful water routes.

Most of these water ways are effected and kept permanently available to steamers by the tides of San Francisco Bay, but some routes depend on the rainfall in the rainy season and melting snow on the mountain tops in the dry period or summer season. It might be interesting to state one item taken from the United States Weather Bureau report to illustrate the enormous water storage capacity of the Sierras that supply the summer flow of the streams, as follows: "Snowfall of 1911 at 8000-foot altitude, near Tamarack, in Alpine County, sixty-five feet, six inches."

SAN JOAQUIN VALLEY DISTRICT

THE San Joaquin Valley district is bounded on three sides by high mountains; on the west by the Coast Range; on the east by the Sierra Nevadas, including Mt. Whitney, the highest in the United States, and on the south by the Tehachapi Mountains. On the north it extends along the west and south banks of the San Joaquin River to tidewater on Suisun Bay. This gives it a length of over 250 miles and a varying width averaging probably thirty-five or forty miles of level and rolling lands. It has an almost constant gradual fall from 400 feet altitude at the foot of the Tehachapis to the Suisun Bay level at the north, which makes it appear in most places as level as a floor.

The great mountain range on the east is the big reservoir that supplies water for irrigating these plains. These towering heights are covered with perpetual snow and ice which, during the rainless period in the valley, partially melt and supply the water just when it is most needed.

Not many years ago this region was famous for its great grain ranches and numerous herds of cattle and flocks of sheep. At present it is world renowned for its vineyards and orchards, but it also yields many other farm products in large quantities, including various live stock, butter, poultry, and eggs. Soil, cli-

mate, and water for irrigation make it possible to raise almost anything that can be produced on a farm anywhere.

In early days the poultry industry experienced more "ups and downs" in this section than in any other part of the State. In many spots the conditions for raising fowls was so inviting that most beginners first raised the fowls and then looked about for a market for their poultry and eggs.

Until recently conditions for profitably marketing the product and economically obtaining a proper variety of feed were very unfavorable, particularly in the lower half of the district, but matters have now greatly changed for the better and are improving steadily. This is due to several causes; the local demand is rapidly increasing; transportation facilities have vastly increased, and rates are more reasonable, beside the poultry producers have fairly well organized. We might add that the Santa Fe Railway system also helps; it has men in the section whose sole business is to assist and advise agriculturists who locate in the territory served by its roads.

Both the Southern Pacific and Santa Fe system main lines traverse the center of this district and each has numerous branches and loops serving all the settled portions.

The southern two-thirds of this section has no water routes, but a good share of the northern third enjoys excellent water service. At times during high water the San Joaquin River is navigable as far as Hill's Ferry, 195 miles from its mouth, but regular steamer traffic is maintained for only a comparatively short distance.

The following extract from the report of the California State Board of Agriculture indicates that this may soon be greatly improved. "The navigation of the upper part of the San Joaquin River is now engaging serious attention by those interested in the development of this great valley, and a determined effort is being made to accomplish this great work, by taking actual steps to prove its feasibility, and to induce the federal government to assist in promoting the undertaking by making the river

navigable as far as Herndon, if necessary by canal for a portion of the distance." When this is accomplished the writer would like to own a well equipped railway along its banks. As a carrier of high-class freight and passengers, such a road should be a steady dividend winner.

However, the rail rates on poultry food are not excessive. From San Francisco to Fresno in the center of the valley the rate is \$2.75 per ton and to Bakersfield at the upper end, \$3.35 per ton. From Los Angeles to Bakersfield, \$3.20 per ton. These are the rates in carloads of fifteen tons or more.

SACRAMENTO VALLEY DISTRICT

POULTRY raising in the Sacramento Valley has passed the trial or experimental stage and with all former objection or excuses answered or disposed of by successful poultrymen it is now acknowledged one of the most attractive and safe fields for poultry culture.

For forty or fifty years this section has furnished the major portion of all the turkeys consumed in California and we never remember hearing any statements as to the climatic conditions adversely affecting the successful conduct of this branch of the business in any part of the valley, but with chickens it has been different.

Up to about ten years ago comparatively few people in this district raised chickens, pigeons, or rabbits. "The climate is too hot," the doubters would say, or, to be more exact, they meant to refer to the great length of the warm period and natural lack of protection from the sunshine. By way of explanation to those who are not acquainted with the peculiarities of California climatic conditions we might explain that the whole Sacramento Valley is, strictly considered from an Eastern poultryman's point of view, a winterless district, even well up into the foothills of the Sierra Nevada Mountains and the Coast Range. Other conditions and not latitude govern the temperature, growing and ripening periods. For instance: It has been correctly stated that the varieties of vegetables for market that may be safely planted in the open in the northern part of the valley near Red

Bluff include for November planting eight sorts, for December five, January ten, and for February eleven varieties. As another illustration: On the line of the Central Pacific railway near Summit, in Placer County, at an elevation of 7017 feet, where nearly all the natural ice is produced that is consumed in California, the annual snowfall amounts to from twenty to fifty feet, while at Rocklin in the same county, on the same railway, and only twenty-nine and one-half miles west of Summit the lowest temperature record we can find is twenty-four degrees above zero. At the same time that one lot of men are cutting ice—real ice—near Summit, those of another neighborhood around Rocklin are busy gathering the orange crops for market.

This is wandering somewhat from poultry matters, but the conditions are so peculiar it seems necessary because it is this long continued period of warmth, extremely short period of near winter conditions, and the knowledge that our domesticated fowls are jungle or forest creatures and not natives of the plains like prairie chickens, that created the doubt as to the successful conduct of poultry raising in this valley.

It is true that fowls must in the interior valleys be furnished with abundant shade, fresh water, and every means to keep comfortable or they will not be thrifty and profitable. This is very simple and inexpensive so far as building construction is concerned and for that matter constantly growing green shade can readily, with little effort, be maintained the year around.

In all sections of the valley electric power is abundant and wonderfully cheap, therefore water for irrigation can be obtained and economically pumped owing to this low cost of energy and because it is near the surface. In some parts it is just under the top soil or will rise to that level from a depth of thirty or forty feet following the sinking of a well. In many places water can be had from mountain streams and also drawn or pumped from rivers. There is no lack of water in this valley and some seasons it has too much of this good thing. In so far as a constant growing and

varied supply of green feed stuff is concerned the Sacramento Valley is simply a paradise for chickens, but it is up to the poultrymen to use sufficient forethought in planning to supply the proper rotations of green feed crops and water to irrigate during the rainless period. It has been demonstrated that with unlimited and varied green feed fowls produce maximum results with only two-thirds of the grain, meat, and mill feed stuff they would otherwise require, and furthermore they are healthier and the flesh and eggs are of superior quality.

In many respects the Sacramento and San Joaquin valleys are similar. They are shaped and bounded very much alike and their crops and climatic conditions resemble each other to a considerable degree. In transportation, however, the Sacramento Valley enjoys a much greater extent of water routes. This comparison applies particularly to the portions of the two valleys farthest removed from tidewater.

"The water of the Sacramento River is supplied in the winter season by rainfall and in the summer season by melting snows in the surrounding mountain heights which renders it navigable for steamers to Chico Landing, 273 miles north of San Francisco, during the entire year, and one coastwise shipping firm runs one of its ocean steamers from coast ports to Sacramento city. The Sacramento River, when compared with all navigable streams in the United States, ranks fourth in tonnage.

This is the last grand division of California to cut its great land holdings and invite settlers to undertake intensive cultivation of special crops on smaller farms.

Professor Elwood Mead states as his opinion that when the complete utilization of the Sacramento and San Joaquin rivers, for both traffic and irrigation, is accomplished, California will possess the largest rural population of any state in the Union.

Rail service in the Sacramento Valley is also abundant. The Southern Pacific system has through main lines and numerous branches on each side of the river, and the Western Pacific main transcontinental line traverses the eastern portion. In this section also is to be

found some of the most modernly efficient and extensive electric railways. To describe them as interurban lines would scarcely convey the proper idea. They are real railway systems operated by electric power generated by the melting snow in the high mountains bounding the valley on the east.

We have mentioned that this is the State's greatest source of supply for turkeys. The Sacramento-Stockton district and San Joaquin Valley also supply large numbers and in quality and size of individual flocks they compare with those of Sacramento Valley. In all these sections many flocks may be seen that contain hundreds of birds in each band and some breeders own flocks of nearly 2000 turkeys. The poults are given most careful attention while small in quarters usually near by the owner's residence, but as soon as well weaned they are herded like sheep over the plains and lowlands in search of insects, wild seeds, grasses, and waste grain lost in the process of harvesting the cereal crops on the large ranches.

For size and beauty the ordinary California turkey is some bird and exceptional specimens are wonders. The writer once owned a Mammoth bronze tom that weighed forty-two pounds when only in ordinary condition; has seen one that scaled fifty-six pounds, and has read of one in the San Joaquin Valley that weighs sixty pounds.

Several localities in the Sacramento Valley district have already developed into important and profitable poultry centers and find an excellent local demand for the product in the valley as well as in San Francisco, but the development has only begun.

The rail rates on feed to the extreme northern end of the valley beyond the water routes are parallel with those of the San Joaquin Valley.

SONOMA-EL VERANO-NAPA DISTRICT

THE Sonoma-El Verano-Napa district is near by and similar to the Petaluma section. A good share of this section also enjoys the same benefits of steamer service and excellent steam and electric railways.

Poultry raising and diversified farming are

rapidly taking the place of the former large ranches. Good transportation facilities and nearness to markets insure a steady and permanent growth of the industry in this district.

SANTA MARIA-ARROYO GRANDE DISTRICT

THE Santa Maria-Arroyo Grande district is a more or less isolated section. Freight rates on feed from San Francisco are higher than to the extreme ends of the great interior valleys, but notwithstanding the disadvantages of remoteness and high rates of transportation these poultrymen are prosperous because they are better organized than any other district and exercise genuine economy both in buying supplies and in selling the product.

MARTINEZ-CONCORD-WALNUT CREEK DISTRICT

THE Martinez-Concord-Walnut Creek district (San Ramon Valley), is located near the large cities on San Francisco Bay, but is separated from them by the Oakland Mountains. Until recently it required a considerable roundabout journey over a branch railway to get to these markets from the greater portion of this section, but now these mountains have been tunneled both for vehicle traffic as well as for the Oakland, Antioch and Eastern Electric Railway, which extends from Oakland to Sacramento and which with its branches serves practically all of the San Ramon Valley and reduces the time by rail from hours to minutes.

Naturally this section is enjoying a great boom and along with the general improvements the poultry industry is making a very rapid growth.

In regard to transportation, we should state that a branch line of the Southern Pacific railway extends the full length of the valley and the Santa Fe system's main overland line passes over the northern portion. Water transportation is also available at Martinez and Antioch.

NORTHWESTERN COAST DISTRICT

THE Northwestern Coast district is divided into several small sections, each of which is served by small steamers, all of which are operated by lumbering companies excepting several lines running to Eureka.

Most of this coast district is heavily timbered and lumbering is the great industry. Some poultry produce is sent to San Francisco but a very large portion is consumed at or near the localities where it is produced. The only exception to this general statement is in regard to Eureka and vicinity on Humboldt Bay. This thriving section is served by several regular coasting steamship lines, and in addition the recently completed extension of the Northwestern Pacific railway established through rail passenger and freight service from San Francisco to Eureka on December 1, 1914. Additional smaller local railroads connect Eureka and Arcata with the agricultural and lumbering districts to the north and east. This is a rich and prosperous section and ships quantities of produce to the large city markets, including butter, eggs, and poultry.

At Crescent City to the north the poultry business is growing, also at Fort Bragg to the south. This last named point is now served by a railway recently completed from Willits, a point on the Northwestern Pacific railway to the port of Fort Bragg.

NORTHEASTERN MOUNTAIN DISTRICT

THE Northeastern Mountain District, although settled before the discovery of gold in California, has until recently been almost completely isolated, but is now rapidly developing along agricultural lines owing to the markets afforded by the railroads which have recently been extended into that part of the State.

Many years ago we were told by miners and cattle ranchers that fowls thrive wonderfully in this section. An acquaintance, who operated a mine in Lassen County, once stated that in those parts it was a common saying that no one ever heard of a hen dying a natural death in that neighborhood. A peculiar local custom of that period was also out of the ordinary. The price of eggs was universally 50 cents per dozen at any and all times of the year and chickens changed hands at 25 cents each regardless of the season or size, weight, age or condition of the fowl.

At some future time this section will doubtless be a great poultry district.

EASTERN MOUNTAIN DISTRICT

THE Eastern Mountain District is spotted here and there with isolated poultry farms and also boasts of a few poultry centers varying greatly in size, two or three of which are rapidly becoming commercially important. The product of these poultry raisers finds a market almost entirely in neighboring mining camps and usually they realize prices greatly in excess of those prevailing in the valleys and cities.

Some of these isolated poultrymen are the most independent and contented individuals

imaginable, who would not exchange their little poultry outfits and the enjoyments and healthful vigor that are inseparable from this mountain life, for a kingdom.

It is in this region that Bret Harte, Mark Twain and other noted writers absorbed their initial inspiration, and it is possible that there are still to be found in this section old people, now engaged in poultry keeping, who knew these famous men as neighbors when they were residents of these same mountains in their early years.



50,400 eggs prepared for shipment

Possibilities of Poultry Industry

THE following questions, which we have endeavored, with the assistance of others, to answer briefly and to the point, are frequently asked by intending settlers from points outside of the State, and we trust they may interest readers of this work.

HAS THE CALIFORNIA POULTRY INDUSTRY
GREAT OPPORTUNITIES?

As stated on another page, "we believe that California offers a wider and more inviting field for future development in this branch of agriculture than any other State of the Union."

This State has never produced sufficient poultry and eggs to supply the demand, and still resorts to shipments from other sections of the country to make up the deficiency.

The tendency of our agriculturists to specialize on one crop assists the poultry producer

everywhere in the State to find an excellent market for a good share of his choicest fowls and eggs in his own neighborhood, and the large growing cities will always take this grade produce at top prices, and any seconds or left over stock at a somewhat less but still profitable figure.

ARE CALIFORNIA POULTRYMEN ENTERPRISING?

Yes. The building up of the great Petaluma poultry district in a few years is one example.

In California many more incubators and brooders are used in proportion to the number of fowls produced than in any other part of the country and more commercial hatcheries are in operation here.

At present there is comparatively more co-operative effort made in this State than elsewhere.



Poultry growing under ideal conditions

In regard to poultry shows: Usually the attractions at poultry exhibitions are limited to the display of beautiful fowls and fancy feathers, which is highly commendable and instructive as far as it goes, but a great number of visitors to these shows are disappointed owing to the lack of instruction along the lines of utility. California poultry breeders have also demonstrated they are enterprising in the way of shows. A practical effort to assist our poultry raisers to create a better and more profitable market for their produce was made at the last annual exhibit of the San Francisco Poultry, Pigeon and Pet-Stock Association. This was the first real effort, on the part of an American fanciers' club, to include a properly arranged and extensive department devoted to utility fowls of pure bred strains. These fowls were displayed in large yards with the floors covered with a deep litter of bright, sweet straw in which the fowls were kept busy scratching for seeds. Numerous feeble attempts have been made in this direction, but never before in such a thorough and extensive way.

These fowls were also officially judged, to determine their capability for laying and pre-

potency, under the Hogan system by the originator, Walter Hogan of Petaluma. The utility score card of each bird was displayed on the yards and published in the show catalogue stating each fowl's capacity to produce certain numbers of eggs and to endow its progeny with its own valuable physical qualifications.

This feature of the show was not only very attractive and interesting but will result in permanent practical benefit to the poultry industry of the State.

But this was not the only novel and practical addition to poultry show attractions inaugurated by Mr. Talbot, the secretary of the association. The egg-testing demonstration by a professional expert egg tester created profound astonishment among the exhibitors and visitors and attracted the attention of representatives of the federal government.

By means of a dark room equipped with a long battery of electrically lighted testers, Mr. Lindley displayed sixty eggs all of different grades and value. He explained the reasons for lack of quality in some fresh eggs and advised how to prevent deterioration. It was a complete surprise to nearly every one to

learn that absolutely fresh eggs of the same size, color and weight often vary greatly in quality and value. With other classes of eggs he illustrated the results of correct and incorrect feeding; the effects of pure and foul or alkali water and good and bad condition of storage eggs due to proper and improper methods of handling in cold storage, etc.

It was generally conceded that this was the most successful attempt ever made by a poultry association to afford visitors practical educational instruction and advice regarding the production and marketing of eggs.

The exhibitors were also treated to a demonstration of enterprise for their particular benefit. An expert and thoroughly competent breeder was employed by the association to promote sale for both visiting and absentee exhibitors for which no fee was exacted from either buyer or seller. It was estimated that the sales made here were more than double those made at all the fall shows, held on prior dates, combined, which indicates that it was a successful as well as appreciated innovation.

WHAT ADVANTAGES HAS CALIFORNIA IN PRODUCTION OF POULTRY FEED?

In addition to the advantages we have in the constant production of green feed, our various soils and climates enable us to economically raise practically every kind of grain and seeds that make suitable feed for poultry, and

this affords an opportunity to supply them with a wide assortment which in itself is an important benefit for the reason that fowls crave great variety and do not produce maximum results when fed only one or two sorts of grains, no matter how wholesome or nourishing they may be.

We can also cheaply produce pumpkins, squashes, beets, carrots, turnips, etc., all of which are excellent feeds much relished by the fowls. These in a measure are in the nature of green feeds, but it is better to consider them as belonging in the list of staples and make provision to also supply the fowls with real green feed such as grass, kale, lettuce, rape, etc., which can be with a little ordinary care and forethought, produced every month in the year in nearly every part of the State.

WHAT ADVANTAGES HAS CALIFORNIA IN CLIMATE?

Taken as a whole our climate is—or to be more exact—our many climates are unusually favorable for the economical housing and feeding of fowls. In nearly all sections it is mild and equable and this enables us to provide growing green feed during the entire year. We can also produce almost anything that is good for fowls that can be raised anywhere else in the world.

In housing we naturally can also make a saving because of the mildness of climate, but



33,000 eggs ready for incubation



Future Layers—a big band of pullets

it is proper to state here that if the buildings are properly and substantially constructed our saving in this respect is not as great as many beginners are led to believe.

WHAT DISADVANTAGES IN CLIMATE?

There is only one feature that might be classed as a disadvantage. The long-continued period of warmth and lack of cold weather in all but the high mountain section of the State is favorable for the production of lice and mites. These, however, may very readily and at a trifling cost be prevented or destroyed by our modern methods of spraying. The spraying materials are manufactured chiefly from crude petroleum which we produce here in abundance.

Even this possible disadvantage is a blessing to the careful and energetic poultrymen for the reason that it tends to drive the lazy and shiftless out of the business and leaves a wider field for the thrifty producer to supply.

IS THERE ANYTHING PARTICULARLY UNIQUE OR INTERESTING IN REGARD TO MARKETING POULTRY PRODUCTS IN CALIFORNIA?

There is probably no state other than California that produces a very large part of the eggs it consumes and at the same time depends to such an extent on shipments from other parts of the country for its table poultry. What is the cause?

Up to very recently the chief aim of nearly every California poultry raiser has been the

production of eggs. It is universally considered far easier for the beginner to learn how to succeed with an egg farm than with a broiler plant or poultry farm intended to produce chiefly fowls for table purposes, and it requires a longer period to learn how to properly and economically produce and finish choice table fowls, and what is more important, it takes a little time and some salesmanship to establish a reputation and find just the right market. These factors of course greatly influenced our poultrymen in a choice of the egg branch of the industry, but a more potent one swayed them in making their decision. It is this: We all know that large shipments of live and frozen poultry are constantly arriving in San Francisco, Oakland and Los Angeles from the Middle Western states, and our poultrymen imagine this supply entirely regulates the price of California raised fowls. It does greatly influence the price of poor and fair to middling stock, but has little effect on that of choice table fowls.

It has been demonstrated that the production of poultry for table purposes can be successfully and profitably carried on in practically every section of California and it is a fact—every buyer of table poultry will indorse this statement—that it is always difficult and sometimes impossible to obtain really choice table poultry in the open market in any part of the State.

It is therefore safe to state that as soon as

a poultry raiser makes it known that he can and does produce extra choice fowls and can also put them in proper condition, his output will be engaged by some buyer for special customers. His returns will also be much greater than newspaper quotations. Such fowls as these seldom pass through the ordinary market channels.

In view of these conditions we may assume that these extensive shipments of Eastern fowls to California will continue only as long as the demand is not supplied with California raised fowls of equal or better quality.

WHAT ADVANTAGES HAS CALIFORNIA IN TRADE
AND DISTRIBUTION OF POULTRY PRODUCE?

The rapid subdivision in all parts of the State of the former great ranches into small farms and the substantial development of electric and steam railroads in addition to our wonderful network of waterways all assist to promote economical and extensive distribution of our poultry produce.

As to Local Opportunities—As stated elsewhere the tendency of our farmers to specialize on one product and the rapid growth of cities in all sections create local opportunities everywhere.

The great increase in shipping brought about by the opening of the Panama Canal creates a demand for many more ship supplies, and the poultry produce required by a passenger steamer particularly is an important item in the steward's requisition of ship's stores.

As to Interstate and Foreign Opportunities—Until we can produce sufficient poultry and eggs to supply our own wants there will be little or no incentive to seek trade beyond our State boundaries. At times shipments of eggs and frozen guineas and squabs have been made from California to New York and other Eastern cities at prices satisfactory to the shippers, which indicates that we can reach these markets when we produce more than is sufficient for home use.



Flock of laying hens at Petaluma

What California Is Doing to Improve *the* Quality of Poultry Products

By Edwin T. Lindley

Judge and Official Egg Tester for San Francisco Poultry, Pigeon, and Pet Stock Association

FOR some time after improved methods of grading and labeling poultry and eggs of guaranteed quality had been fairly well adopted by poultrymen of the Eastern states, California still continued to market these products by more or less primitive methods which usually resulted in each container or lot losing its identity immediately it reached the general market or under most favorable conditions did not retain its individuality beyond the retailer's counter; the consumer seldom knew where or by whom his purchase was produced and consequently was unable to reward a careful, conscientious poultry raiser with a repeat order for his brand which had proved satisfactory because of its superiority, but had to be content with what was represented to be just as good. This system naturally tended to discourage the thorough producer and in a measure place a premium on shiftlessness.

However, when Californians awake and strive for improvement they usually make a sudden and vigorous effort to surpass all others and there is no exception to the rule in this matter of improved marketing methods of poultry produce.

In most parts of the State we now see eggs in sealed containers of suitable size for retail distribution, and a few poultrymen are branding their choice table fowls with metal leg bands which serve the purpose of labels. As yet the movement to establish these im-

proved methods has affected only a comparatively small part of the State's output, but a widespread and more strenuous but practical effort is now being put into the reformation in California than elsewhere.

In Southern California the associations are industriously striving to discover the most feasible and economical method to accomplish the desired result under the conditions peculiar to that district; for the past year the Poultry Producers' Federation at Petaluma has placed its best eggs in sealed cartons and its brand "Everbest" is now regularly quoted in the large markets; numerous individuals have also established their brands and are reaping a deserved reward in better net profits; in many of the towns and smaller cities butchers and other dealers or individuals are milk feeding or crate fattening fowls for local trade, while all large cities now have quite extensive plants devoted to this branch of the business. In fact there is a statewide desire to do something to place California in the front rank as a producer of poultry products that can not be surpassed anywhere in the world, but there has been, until the present, lack of concerted action to attain this end. It is therefore my opinion that the rectifying revolution in the marketing and identification of superior poultry products is just now to be accomplished through the activities of the Federated Poultry Association of California as indicated by its secretary in a chapter elsewhere in this pub-

lication. This society, which has recently become the most potent and important factor in the State's poultry matters, has worked persistently for over two years investigating and discussing the proper policy to adopt and doing preparatory work generally; during this time, through being called into consultation

by the investigating committee a number of times, I came to fully understand its aims and possibilities and can realize what results are soon to come from such practical co-operation by all classes of people who are interested in poultry production in every part of the State of California.

Turkeys *in* California

CALIFORNIA stands near the top of the list of states as a producer of turkeys when considered from the standpoint of numbers, and when it comes to size and quality this State also heads the list.

It is customary to state that more than 500,000 turkeys are raised in this State annually. It is, however, impossible to determine exactly how many are produced because a large quantity, how many there is no means of telling, are consumed at or near the point of production, and many other shipments to the large cities are sent direct from the producer to the consumer, thus rendering the market report of arrivals very incomplete. It is safe to say, however, that the number produced is nearer 750,000 per year. This estimate is based to a certain extent on the report of market receipts of the Thanksgiving and Christmas holidays, but more particularly on the neighborhood reports—usually the estimate of one breeder in a turkey raising locality—that it has been possible to obtain. These reports indicate that probably twenty of the turkey raisers having the largest flocks in the State hatch each spring an average of 2500 poults; forty-five or fifty hatch from 1000 to 1500; eight hundred or a thousand who consider themselves in the work of turkey raising as a business, produce lesser quantities; while many thousands who as a side line or for home use raise from a very few to flocks of fifty or one hundred birds.

The turkey is a native of America and was a domesticated fowl in Mexico from earliest history. There is no reliable evidence extant as to when turkeys were first raised in Cali-

fornia in captivity, but in all probability they were brought here at the time of the establishment of the first missions, being imported from Mexico.

From records obtainable it is ascertained that turkeys were first raised in very large flocks in the Sacramento Valley, which section still supplies a larger number of birds than any other portion of the State. However, the San Joaquin and Imperial valleys, as well as practically every section of the State, also supply large quantities of turkeys in every way equal to those produced in the northern valley. The Sacramento Valley also seems to mature the birds, on an average, a little earlier than the other sections, and usually markets its crop just before Thanksgiving. Except during an occasional backward season when many breeders hold the birds a little longer and send them to market about Christmas time, a special turkey train starts at Tehama four days before Thanksgiving and runs on the west side of the valley to San Francisco, picking up the shipments from the various stations.

The bronze variety of turkey is most popular because it has proved to be the best ranger, and nearly all California turkeys are grown on large ranges. The baby turkeys are usually hatched and brooded by hen turkeys, but some brooders use chickens and others resort to incubators and brooders. It has been demonstrated that the birds hatched and mothered by the turkey hens are better rangers and hunters, and as nearly all flocks are sent out on range after they are about two months old, this method is considered best. The hens

are set and the youngsters fed and cared for in more or less restricted quarters, but when once turned out to hunt their own living they are herded in large bands, sometimes several thousand in one lot and often the property of several neighbors, each breeder's birds being marked to distinguish ownership. Bugs, worms, grasshoppers and other insects form a large part of the food consumed until after harvest, when the birds are herded over the grain fields to pick up the kernels that are lost in gathering the crop. Usually there is a second crop of 'hoppers about this time which supplies the necessary variation in food. In the west side of the San Joaquin Valley, the grasshoppers are often trapped and dried for use at times when 'hoppers are naturally scarce. In 1912 an improved 'hopper trap was introduced in that district. This trap is driven over the immature grain or alfalfa field in the same manner as a mowing machine; the 'hoppers jump into it and are immediately

crushed by large steel rollers. From time to time, as the great valleys of California have become more closely settled, many breeders have predicted that the production of turkeys in large flocks would very soon be discontinued. On the contrary, however, the number of large bands is growing instead of diminishing, and it is a reasonable prediction that they will continue to increase, for the reason that many portions of the foothills of the mountain ranges that are not adapted to general agriculture prove ideal as turkey ranges, better in some respects than the valleys. The only disadvantage is that a few days of extra grain feeding are necessary to finish the birds for market. Even this need not be an extra expense to a careful and practical feeder, because the turkeys properly fed with a selected variety of grain are superior in table qualities to those which pick up on the range only one sort of grain that has been lost in harvesting.

Guinea Fowls

By Wm. A. French

Director San Joaquin County Poultry Association

GUINEA fowls have been quite extensively raised in California for many years, but almost always in small or moderate sized flocks. I have bred them here for thirty years and have found them one of the most profitable of domestic birds. In this State we have two varieties—the white African and the Pearl, or polka dot.

Guinea fowls are excellent for food because they are small of bone and have a full round breast like a quail, while the flesh has a gamey flavor. As wild game is becoming more scarce each year guineas are daily becoming more popular for table purposes, consequently a number of sheep and cattle raisers are taking up the raising of these birds in large flocks. On the ranges and in the wild country the guineas thrive and do not fall a prey to the coyotes as do other domestic fowls.

The eggs require four weeks to incubate. A chicken hen is a good mother for them, but she should have two or three of her own chickens with the brood to help the baby guineas to understand her call and to teach them to eat. The young guineas are quite easy to raise if kept from getting chilled while young. They should be kept out of the wet grass while the dew is on. They like to ramble like young turkeys for bugs and seeds. Feed them small grain and mixed seeds with lean meat while very young, and as soon as they get to rambling they will take care of themselves. When they begin to feather they will roost naturally. They never forget their mother, whether it be a guinea or a hen, sometimes following a chicken hen when full grown. Of the two varieties of the guinea fowl the white African is much more docile, but in other respects their habits are similar.

Rhode Island Reds

By William J. Fox

Member San Mateo Poultry Association

THE poultry industry has grown in importance and the demand for standard bred stock has, within the past few years, increased very rapidly in California, due in a great extent to the fact that large tracts of lands are being divided into small farms and consequent influx of settlers from the Eastern states who are more or less all interested in poultry.



Rhode Islands Reds

Among the various breeds that are raised with profit, the Rhode Island Reds, owing to the many excellent qualities they possess, have become great favorites with the large breeders as well as the back-yard fancier who desires a fowl to fill all requirements.

As winter layers at a time when eggs command a high price they are unexcelled, are extremely vigorous and easily raised in all

climates and at an early age are suitable to market as broilers, their clean yellow legs and flesh making them much sought after for table use. They are good foragers when allowed to roam, and at the same time thrive in confinement.

For the fancier or sportsman who delights in testing his ability in producing specimens able to win in keen competition at the nu-



"Just Hatched"

merous exhibitions, he will find in the Reds a bird whose beautiful, brilliant plumage and attractive type will be worthy of his efforts and a product of which he may well be proud.

Owing to these qualifications we think Rhode Island Reds will soon be one of the most popular and extensively bred varieties in California.

Single Comb White Leghorns

By Harry Mortensen

Student Division, Agricultural Education, University of California

WHICH is the most extensively bred variety of fowls in California and what are the reasons for this great popularity?

It is the single comb White Leghorn, the "commercial egg machine."

The writer has bred these fowls for ten years here in California and continues to do so because they possess the following qualifications: They lay a white egg, which is in greatest demand in the Pacific Coast; they are the smallest eaters of any variety that produces white eggs; in this modern age we are not content to wait until biddy wants to sit, but we use an incubator and set it whenever we please; the Leghorns are entirely in accord with the times by being practically

non-setters, and should Biddy White Leghorn show any inclination to incubate she can be locked up for only a short time to get over it, and wants to lay again.

The several varieties of Leghorns are similar when it comes to habits and laying capacity, but as the whites are more extensively raised, they are easier to obtain.

All hatcheries sell White Leghorn chicks cheaper than any other variety.

In short, I believe the White Leghorn fowl is the most profitable breed for this State because it produces large white eggs at a minimum cost and put the balance on the right side of the book with the least labor and trouble to the poultry breeder.

Houdans

By Fred L. Hall

Member Alameda County Poultry Association

THERE is only one good reason why the famous French fowl—the Houdan—has not been more extensively reared in California. It is that the public has been led to believe that the crest is objectionable. It is claimed that on the coast it has the tendency to gather fog; in the interior counties that it offers a favorable location for vermin, and in the hill and mountain sections that it makes them liable to be taken by hawks and other enemies.

If some capable breeder would breed off the crest and create what might be called a "Calhoudan," such a variety would meet with instant and tremendous demand. It is just such a fowl the poultry ranchers of this State

are wishing for. Notwithstanding these more or less groundless objections, Houdans have been raised in all parts of California for many years and are growing more and more in popularity owing to their unsurpassed table qualities.

All well conditioned specimens of this breed meet with immediate sale at the very highest market price the moment they are exposed for sale by market men.

As liberal layers of large and most attractive white eggs they can not be excelled by any other breed that produces a good proportion of eggs in winter. When properly bred, they are absolutely non-setters.

Orpingtons

By E. J. Talbott

Secretary Federated Poultry Association of California, Member of Executive Committee, San Mateo Poultry Association; Secretary San Francisco Poultry, Pigeon, and Pet Stock Association

THE Orpington was originated by crossing several different varieties of fowls, and like all crosses, possesses exceptional vigor. They come in the following colors: Black, buff, white, blue, red, jubilee, partridge, barred and cuckoo. This is one of the most popular breeds in all English-speaking countries on account of the undisputed merit and unusual attraction in the show room of the varieties it includes.

No variety surpasses and few equal the Orpingtons in beauty and symmetry, and no other fowl possesses the distinctiveness of type. Since they possess such beauty and come in such a wide variety of colors—more than any other breed—every possible taste of the fancier or breeder may be satisfied by them.

In disposition they are very quiet and docile; in size as large as any fowl; in growth as rapid and as hardy as any, and in the production of eggs they equal any large breed

and are as profitable as the Mediterranean breeds, for they will lay nearly as many eggs and can be made to lay a very large portion of them in winter when eggs are most needed. The flesh of the Orpington, for fineness of grain, tenderness and sweetness of flavor, is unexcelled; the cost of rearing this large fowl is no greater than the cost of raising Mediterranean, because the smaller breeds exercise more and consume more energy. Extra good specimens of Orpingtons sell for as much as a horse or cow.

For persons having small lots, where the range is limited, I believe the Orpington is the best breed to keep, and where the production of table fowl is required, the Orpington can not be excelled, while for all purposes it has no superiors and few equals. These excellent qualifications are responsible for the present great and increasing popularity of the Orpington in California.

Black Leghorns

By Samuel Adams Wells

Ex-President California Leghorn Club

I HAVE been asked to state one variety of fowls I consider superior to the White Leghorns now so popular and universally bred in California, and to give my reasons for same.

In my opinion the Black Leghorn will soon be extensively bred in this State and on the Pacific Coast generally. They lay beautiful, smooth, white eggs, fully as attractive as a Minorca egg, and in size they will average larger than those produced by White Leghorns. They are hardier, go through the molt with less serious effects, because they are not so

much inclined to "go back on their feed" or get "stalled" during this process of feather building, and for this reason will lay more eggs in the fall when eggs are at the highest price. There is no reason why the blacks should lay less eggs during the year than the white variety, but with the power to produce more eggs during the fall, they might be even more profitable than an equal number of White Leghorns, which produced more eggs, most of which were obtained at the period of low prices.

Campines

By A. E. Sinclair

Member American Campine Club

I HAVE been asked for my opinion of Campines and their qualities as compared to the present poultry autocrats of California—the Leghorns.

The Campine is of Belgian origin, coming from the Belgian Braekel, and were first found on the plains of La Campine. For some time they have been extensively bred in England, where they are highly prized.

When allowed to roam, Campines are great foragers, which makes it unnecessary to provide much other feed, and where confined they eat about two-thirds as much as Leghorns. They lay early in life and produce nice, large, white eggs. They are hardy and the eggs

hatch well, though I believe in a small number of females to each male to insure vigor and stamina. I have found them steady layers that distribute their egg production practically throughout the entire year, and are rarely broody.

They are very beautiful, make great pets, soon become acquainted with their keeper, and will gather around him whenever he goes among them.

To sum up their valuable qualifications: They are heavy layers, economical, beautiful, have small bones and lots of meat, more breast meat than most any other breed. They are a good bird for the beginner.

Plymouth Rocks

By Ed Ellis

Member San Francisco Poultry, Pigeon, and Pet Stock Association

I AM confident that hundreds of successful poultry dealers in California will support me in the assertion that the Plymouth Rock is unsurpassed as a satisfactory general purpose fowl for this State. I have been engaged in popularizing the breed in California for more than a quarter century with perhaps a trifle of sentimental pride in the work, inasmuch as I was raised near the original Plymouth Rock.

The Plymouth Rock fowls are noted for their ability to quickly and cheaply take on flesh and fat on feed and under conditions that would not similarly affect many other breeds, and for this reason they produce meat

at a minimum cost. However, this tendency to flesh up necessitates some judgment in feeding when the object is to obtain good quantities of eggs. If reasonable care is used in selecting egg-forming food, if the birds are given green stuff, and are made to exercise in litter, scratching for their grain, they will hold their own with any breed, particularly for winter laying.

Plymouth Rocks are gentle, make good mothers, and can be confined by a low fence. They are bred in several colors, but the white and barred varieties are most extensively raised in California. For eating purposes they are without a superior.

Sicilian Buttercups

By W. S. Woodhams

Member Executive Committee, San Mateo Poultry Association

BUTTERCUPS lay many large white eggs, are prime table fowls of moderate size and beautiful to look at, are rapidly winning their way in the favor of our poultry raisers.

This variety of fowl originated in the island of Sicily, therefore belonging to the Mediterranean class, were first imported to the United States some fifty years ago; they were much prized by those then handling them, but not getting into the hands of fanciers until recently were not pushed to the front as they deserved. Now the American Buttercup Club has a membership of about six hundred active lovers of this lovable breed.

In size they appear to be the same as the White Leghorn, but on account of having a full and rounded breast and a general plumpness they weigh at maturity at least a pound more, and having some of the game flavor make a much appreciated table fowl. On the block they appear well and find a ready sale.

In egg production the writer finds by comparison in his own yard that they are the

equal of, if not better than, the justly famed White Leghorns, and with proper care and attention are practically all the year round layers, producing a very satisfactory number of eggs when the prices are at the highest point.

Buttercups are also winning favor with the fanciers as they are very gentle and easy to handle, and with their distinctive cup shaped combs and feather color and markings make a striking and beautiful appearance in the show room.

Buttercups make one of the most profitable fowls for the farm, as they lay well, weigh well, and while gentle and tame, when allowed free range are great foragers, and will make a good living and pay well for themselves where the large and heavy breeds would fail to pay at all.

The color scheme of these birds is not alone interesting but beautiful; to describe it would make this article too long, but as they are now shown at nearly all the poultry shows any interested person can see them there.

Langshans

By George Lohr

Sales Manager San Francisco Poultry Show

I AM glad to have an opportunity to say a good word for the sturdy and profitable Langshan fowl. This vigorous and docile breed has been neglected of late years, but is rapidly coming back into favor among those people who require an all-round general purpose fowl that supplies a large, well-formed roasting bird and a good percentage of large, rich eggs in winter.

If inquiry is made among breeders, who formerly raised Langshans, they will be found full of praise for their old favorites, and almost every one will give the same reason for

giving them up. In former years there was great prejudice among consumers against fowls that did not have a yellow skin. Now white meat fowls like Langshans are demanded by particular buyers. Formerly birds with feathers on the shanks were hard to sell, while today it is the fowl ready for the oven that is criticised. Ten years ago brown eggs were almost universally despised, while today the poultrymen who supply family trade direct or through dealers who take pains to seek customers who appreciate real quality, can sell his Langshan eggs at a handsome premium.

Federated Poultry Association of California

By E. J. Talbott

Secretary of Association

THE great poultry industry of the State of California is represented by the Federated Poultry Association of California. This is a welfare co-operative association composed of most of the individual producers and local associations throughout the State, and the offices of the association are located permanently in San Francisco. Now that the poultry interests of the State are firmly consolidated and solidified, the great work of this organization has only just begun.

In 1912 a number of representative poultry breeders of the State, in keeping with the spirit and progress of the times, got together and decided that some system of co-operation among the poultry people should be established. They appointed committees to investigate conditions, gather statistics and interview the producers. The committees after much labor brought many of the prominent poultry producers of the State together and after careful investigation and consideration the Federated Poultry Association of California was organized. In a short time it has become the central organization of the poultry interests of the State and is supported by nearly every breeder, producer and local association of California.

The chief object and purpose of this association is, first, to aid in every possible way the producer of poultry, and, second, to aid the consumer. This can be accomplished in numberless ways. The first great evil to remedy in this industry is waste.

The poultry products in California amount to more than \$18,000,000 a year and, but for the waste which amounts to more than \$7,000,000 annually, would reach the sum of

\$25,000,000 or more. The association, by procuring co-operation among the producers, eliminating duplicate shipments, obtaining a more equitable distribution, better shipping facilities and rates, proper supervision of cold storage, will save immense sums of money that are now being lost.

By working for the production of better poultry and eggs, the producer and consumer will each be benefited.

The association has already inaugurated a plan to educate the producers in feeding and breeding, so that they will produce a better and more desirable quality of poultry and eggs, under more sanitary conditions.

While this is not a political organization, the association aims at all times to secure all needful legislation in aid of the poultry industry and just at the present time is actively engaged in procuring the passage of an important bill, providing for a State commissioner of poultry, and another for the regulation of imports.

EDUCATING THE PUBLIC

Every means possible is now being taken by the association to educate the public to demand and require a better quality of eggs and poultry and the producer how to improve his output. The production and sale of well-bred stock is receiving careful attention, and for that purpose the local associations and shows are given every assistance and encouragement.

A bureau of information and investigation is maintained which is at the service alike of members, consumers and the public. By bringing them all into closer contact, a better understanding and greater sympathy will be estab-

lished. By furnishing advice and information, beginners and inexperienced persons, especially those of small means, are being given the right start in the poultry business and assisted in making a success instead of a failure, as has happened to so many in the past.

The field in California is so large, the State is so extensive, the localities adapted to poultry raising are so numerous and the number of producers is increasing so rapidly, that this association has in a very short time grown into a most important and powerful aid to the poultry industry.

The president of the association is Mr. George H. Croley, one of the pioneer poultry men of California. Mr. Croley is also president of the largest poultry supply and feed company in the State. No man has a deeper insight into the poultry business than has he, and no one has done more for the industry in California. His whole life has been devoted to improving and bettering the conditions of the producer of poultry and in any movement for public benefit his time and energy have been freely devoted without remuneration of any sort.

Mr. Croley located in San Francisco in 1884 and at once started a poultry journal and opened a bureau of information for poultry raisers in connection with a store for the sale of poultry supplies. Others, in various parts of the country, had for years sold supplies as a side line to other businesses, but his was the first exclusive poultry supply establishment in America.

Few persons now living know that all the important modern improvements in connection with poultry culture originated with men in California and Mr. Croley either directly or indirectly assisted in bringing them to a successful finish. Mr. Stevens of San Francisco invented the egg case and filler that simplified the economical handling, distribution and storage of eggs. Mr. Byce of Petaluma originally perfected the warm air system of incubation.

Mr. Bessey of Sunnyvale first made practical the use of hot water for operating incubators.

Mr. Fisher of Chico was first successful in hatching eggs by electrically applied heat, and

also first employed the system of diffused ventilation, which does away with the necessity of supplying moisture directly to the eggs during incubation.

Mr. Walter Hogan of Petaluma completed after coming to California his system of selecting breeding fowls, which is revolutionizing the methods of poultry breeding.

Nearly all these things were accomplished many years ago and all were helped and encouraged by Mr. Croley through the educational and welfare bureau which for more than thirty years he has conducted in connection with his business.

Probably the most far-reaching aid given the poultry industry by Mr. Croley was his system of feeding incubator chicks. More than twenty-five years ago incubators were considered to have been practically perfected, but through lack of proper knowledge of feeding the baby chicks and consequent inability to raise them, the practice of artificial incubation was about to be abandoned. Mr. Croley then devoted three years to research and experiment which resulted in his invention of the dry grain and seed method of feeding infant chicks now in universal use—the article now generally known as commercial chick feed, and which invention he gave to the world. Few now engaged in poultry culture realize to what extent this revolutionized poultry raising in foreign countries as well as in America, or how many of these foreign countries demonstrated their appreciation of Mr. Croley's work.

Diplomas and many letters of commendation were received by him from foreign agricultural societies and similar organizations, as well as parliamentary resolutions of thanks. His achievements, together with his high sense of honor and integrity, have been long appreciated in California, and when the association was organized he was unanimously called upon to take charge of it. He responded promptly, threw himself into the work with his accustomed energy and enthusiasm, with the result that the poultry business of this State is now to be placed upon a basis superior to that of any other State in the Union.

The Hogan System of Selection of Fowls

By Walter Hogan

I HAVE been asked to give a brief history of the discoveries that have resulted in my system of scientific selection and breeding of poultry to obtain maximum egg production and which now has reduced the breeding of poultry for profit to a business of reasonable certainty instead of one in which the element of chance was invariably to be reckoned with.

The writer's introduction to poultry keeping was in Massachusetts in 1857. About the year 1873 I made known my first important discovery—the pelvic bone method of selection—to Mr. Albert Brown, a banker of Amesbury, Mass., and Mr. O. H. Farrar, overseer of Hamilton Mills.

My friends early prophesied that my penchant for invention would land me in the poor house in my old age, owing, they said, to my inventions and discoveries being a hundred years ahead of the times. So, by some occult inspiration, I was induced to abstain from publishing any part of my discoveries in regard to poultry until 1904, when old age was creeping on me and the poultry outlook was more auspicious. Then, by advice of ex-United States Congressman Haldor E. Boen, I decided to publish only my first discovery, after it had been tested by Professor Haverstadt, superintendent of the Minnesota State Experimental Station.

The first publication was in 1904 and was written by Mr. M. F. Greeley, editor of the *Dakota Farmer*, from notes I gave him. He included my second discovery regarding the depth and condition of the abdomen, but refused to make mention of the skull theory, which has since proven in California to be the

most important discovery of all. He stated that any reference to it would make me the laughing stock of the world.

However, my years of costly research in the Eastern states brought me no financial reward and little appreciation, and in the spring of 1906 I came to California, still hopeful, but a physical and financial wreck.

After regaining my health in this new Land of Promise, I began to build up a flock of layers averaging more than 200 eggs per year, like those I had previously owned in the Eastern states, with the idea of proving the value of the skull theory and its relation to prepotency. That my system was finally and genuinely appreciated by the public is due to a large extent to Professor M. E. Jaffa of the University of California, who was the first man in public life in this State to test and verify the value of my system of selection. At the request of the Petaluma Poultry Association he had the system tested at the California Poultry Experimental Station for four years, thus demonstrating its value when applied to hens during the entire period, four years, that is considered the ordinary life of the laying hen.

After many years of disappointment I now feel that I have, assisted by the beneficial climate of California and the encouragement of its people, finally been rewarded; further, that I will yet have the pleasure of witnessing a widespread appreciation of the system as developed in California and enjoy the satisfaction to be obtained from watching the beneficial results it will afford the poultry breeders both here and elsewhere.

Bee Keeping *in* California

By A. B. Schaffner

Manager Consolidated Honey Producers of California

Editor's Note: California bees have been wealth winners since the first colonies of improved strains were first brought to this State in the '50s. At first their work in the mountains with the wonderful wild nectar-producing plants soon made California famous in bee keeping for its extent and unique methods and in the honey trade for the unequaled excellence of its product. In later years the bees in wild places have been rivaled by the bees on the plains. Mr. Schaffner writes from close knowledge of all these matters.

PERHAPS the most essential factor in the further development of the honey producing industry in California, with its resultant extensive by-production of beeswax, etc., is not a greater demand, but a greater supply; or, in other words, more and better bees, more and better bee keepers and more complete organization, along co-operative lines, for the marketing of the products.

For the lack of sufficient bees to gather the nectar from California's myriad blossoms, it is safe to say that each year a hundred times the amount is lost that is secured. Needless to state, therefore, the industry is not as yet overcrowded, and is one presenting many opportunities for pleasurable, lucrative and interesting work, for which there is a wide field, extending over a thousand miles of territory from Siskiyou County in the north to Imperial in the south and embracing every variety of climate known to the State.

According to a well-known authority on the subject, Mr. John H. Martin, whose writings over the nom de plume of "Rambler" have become quite famous among bee men, Mr. John S. Harbison was the first to successfully introduce bees into California, though a few hives were sent here several years prior to Harbison's shipment.

Twelve colonies (or hives) were first shipped, but only one survived the long sea voyage, and this, taken to San Jose, threw off three swarms the first year. The death of the owner resulted in the sale of the colonies, which brought about \$100 each. The next lot of seventy-eight colonies was imported by Mr. William Buck. Of these twenty-five colonies survived.

During these years it was believed that bees could not live in the Sacramento Valley, but Harbison finally decided to experiment there with a single colony, the result being that the bees not only lived but produced a large quantity of honey. Harbison then went East and prepared a shipment of sixty-seven colonies of bees for California, which he shipped by way of the Isthmus to San Francisco and thence up the Sacramento River to their destination. Only five colonies were lost on this trip. This was in 1857. More shipments were made the following year and from these colonies has developed the present extensive industry, accounted one of the most profitable in the State.

The modern beehive might aptly be described as a "box for bees," but it is well for the neophyte not to take this too literally, since much of his success will depend upon the

more than 100 carloads annually of the finest honey in the world.

A colony of good bees will produce about seventy pounds more honey than is required by the insects themselves in almost any fair locality in the State. One colony sometimes produces 400 pounds of honey. This, at the low price of five cents a pound, would amount to \$20, or four times the value of the bees, not including the wax.

Bees may be handled at comparatively small cost, but as there is much detail in the culture, close attention is required if more than mediocrity in production is aimed at.

One of the important features of the work is that of moving the colonies from one place to another in order to take advantage of the crops of nectar-producing flowers, which bloom in different seasons and localities. In the early spring, the willow blossoms are a big aid in getting the colonies built up for the later honey flow. In the fall, in most parts of the State, there is material for winter supplies. The moving of the hives is accomplished nowadays by means of motor trucks, in most instances; the old method of horse-drawn vehicles having been unsatisfactory, necessitating that much of the work be done at night owing to the practical impossibility of preventing the bees from escaping and stinging the horses, thereby causing disaster. There were other drawbacks, heat being one of the most serious. The motor driven truck has eliminated them all. The moving of bees from one locality to another results in more healthful colonies. Disease has caused some

loss among the bee colonies in the State recently and a bill is before the present session of legislature to secure uniform State control of all counties. If passed this bill will create a school for inspectors and bee keepers at large, thereby adding to their efficiency.

The State Bee Keepers' Association (officially known as the "Consolidated Honey Producers of California"), covers the entire State and has affiliated clubs in all the larger honey-producing counties. Through this organization much legislation and legal regulation of a beneficial nature has been accomplished; a standard of grades and prices has been established and various movements for the development and advancement of the industry made.

This organization has aided the industry materially through systematic marketing and by controlling the price of honey. It has made an average increase in established prices of two cents per pound over what was paid six years ago. Plans are on foot to secure the co-operation of the State University in providing gratuitous instruction and education for California apiarists.

There is, however, room for improvement in the honey business in this State; for advancement and better organization, along the lines of other industries. Many of the producers of honey are now members of local or county associations formed to market their product and purchase supplies on the co-operative plan, which method is being rapidly adopted by many producers in other lines.

There are many large honey buyers who buy in carload lots and ship to the East or to Europe. Numerous bee men are now organizing in co-operative clubs and are learning to pack their own honey for retail trade.

In conclusion, it may be truthfully stated that the honey industry is still in its infancy in this State, despite that it has been in existence here for half a century. There is room in California for many more ambitious apiarists who, providing they study the conditions carefully and give time and attention to the business, can not fail to achieve success.



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The Autumn Number

SHORTLY before October 1, 1915, will be issued the Autumn Quarterly Number of CALIFORNIA'S MAGAZINE. It will be a particularly fine number and will include many exceptional articles by prominent Californians upon subjects of interest and importance. A few of these articles are announced in the department of Publishers' Notes in the front part of this number.

THE illustrations for the Autumn Number will be notable for their beauty and rarity, and a number of four-color plates from natural autochrome negatives will be included.

BUT the most interesting fact in connection with this number is that every article will depict some phase of California life and work, practical or picturesque. In other words, it will be a distinctly representative California magazine—just as this number is representative of this great State. Our staff writers are on the alert constantly for striking features and valuable data on California industries and resources, while the contributing staff, which includes many of the foremost men and women of the State, is preparing special papers upon important topics. No one who is interested in California can afford to overlook any number of CALIFORNIA'S MAGAZINE. Remember, that by subscribing now for one year at \$2.00 you will receive this Cornerstone Number, which sells singly for \$1.50, and three more quarterly numbers, each of which will be a veritable library of information concerning California.

California's Magazine

New Call Building

San Francisco, Cal.



An Appeal to Readers of California's Magazine

NOW that you have gone over this number of CALIFORNIA'S MAGAZINE, what do you think of it? We want your opinion; it is valuable to us. Furthermore, we want your interest, your support. And just here, we will try to tell you why you should be willing, even anxious, to lend us your support:

California is a great State. If you are a Californian—that is, living and working in it—it is YOUR State, and its interests are your interests.

If you are not a Californian, you should be interested in knowing more about a State that has done so much for its citizens—for you never can tell but that you may soon become one of them yourself.

WE ARE TAKING CALIFORNIA TO THE WORLD in this magazine. We have let the really big men and women of the State tell the world what California has done, is doing, and means to do for the world.

Ours is a constructive work in a day and age when construction is necessary to offset the destruction in certain parts of the civilized world.

You are a builder and therefore a peacemaker if you are laboring honestly and happily and making a home for yourself and family. Therefore your interests are our interests and *vice versa*. If you lend us your support, the things you do will not "return unto you void."

Send us your subscription now and induce your friends to do the same. Also do not fail to register with us and take advantage of our READERS' SERVICE.

California's Magazine

New Call Building

San Francisco

The Readers' Service of California's Magazine

FREQUENTLY, throughout this number of CALIFORNIA'S MAGAZINE, we have called attention to the *Readers' Service* and urged our readers to avail themselves of it to any extent desired. We have endeavored to show just how this Service might be employed by the individual in attaining the realization of his ideals and in the bettering of his condition generally. The contents of the magazine have, we feel certain, been the means of interesting the public to even a greater extent than heretofore, in the quality of California's appeal to the people of the world, of its marvelous productiveness and its innumerable attractions for those who appreciate living under right conditions and amid superior surroundings.

In considering the employment of our Readers' Service for your individual needs, first of all rest assured that it commits you to nothing. You are under no obligations whatever if you confide your desires to us, and our only aim will be to serve you and the State by telling you all you wish to know about California and transacting for you any business that will result to your advantage. While this is termed "Readers' Service" and is, unmistakably, for the use of readers, it is also a service to the State because the State needs you as much as you need it. In other words, California needs citizens, more men and women of the right sort, and this means, of the best class. Not necessarily persons of wealth, but those who are industrious, high-minded and who want to live right in right surroundings.

A PERTINENT STATEMENT

D R. BENJ. IDE WHEELER, President of the University of California, speaking, in his article in this issue, on the size and population of California, says:

"California is really still an undiscovered land for most of the world, as it certainly is an unoccupied land. Otherwise the fairest land provided for the residence of men would have more than fifteen residents to the square mile, and farms of ten thousand acres, any ten of which would support a thrifty family, would not be so common as they are."

What does this signify? Simply that California must have more citizens, and so it will be apparent that our Service to readers is also a service to the State.

But—and here is the point to consider—we do not seek to bring people to California by means of florid or flamboyant methods. On the contrary, we have secured from *the biggest men and women in the State*, whose word is their bond, and who are in a position to speak *with authority*, articles descriptive of many phases of California life and work. By thus presenting to our readers the true greatness of California and calling attention to the splendid opportunities it affords for men and women of the right sort, we leave no room for a doubt to arise in

their minds as to the authentic character of the information, and they can be confident that if they are guided to California by what they read in this magazine they will at least be certain of not having been misinformed. Furthermore, our interest in clients, those who come to us for information and who act upon it, does not cease when their questions have been answered. On the contrary, we are continuously behind them, ready to suggest, advise or otherwise aid them in attaining success.

EXPERT ADVICE

HOW can we be so certain of being able to do this? Because we have surrounded ourselves with experts; with specialists who are positively the acknowledged authorities in their individual lines. These are the men who will give you the information you require, no matter to what branch of endeavor in California it pertains. *These men constitute our Readers' Service.* They realize with us that the service is a service to California as well as the clients, and they are thus justified in their own minds and in the eyes of the world for their interest and co-operation.

We have thus far spoken as though the only readers of CALIFORNIA'S MAGAZINE were persons outside the State, and that there is, therefore, no means whereby the residents of California may avail themselves of the Readers' Service. This is not the purpose of our plan, however, which aims to serve everyone everywhere, nor of the magazine which aims to represent California and Californians pre-eminently. The resident of California is deeply interested in his own State and its progress, for that means his own progress. There are problems confronting him daily to which he will welcome solutions. It is true that problems here are easier of solution and less plentiful than in most parts of the country, but to deny that they do exist would be absurd. The advice of our Service experts is for all our readers, whether close at hand or in the Antipodes.

WHERE OUR INTEREST LIES

FIRST, last and always, let it be clearly understood that we have nothing to sell, except this magazine. Our interest is with the buyer. If we can, by means of our knowledge and our close touch with people and affairs in California, transact for our readers business in the State, we are glad of the opportunity and will exercise the greatest care in safeguarding their interests.

Naturally, in order that we may keep in touch with the world's people, we want as many subscribers as possible to CALIFORNIA'S MAGAZINE. It is our desire that this publication shall circulate to the ends of the earth, reaching into every home, commanding the interest of every man and woman of intelligence to whom it comes. Only in this way can we achieve our purpose which is, as we have already indicated, to serve California and the people by bringing them together. If by means of our earnest efforts to portray California in its real character we can add largely to its citizenry, develop some of the land which is undeveloped, better the conditions of families and start many persons on the road to greater happiness and prosperity than has been their portion hitherto, we will have

accomplished a truly humanitarian service and have been sufficiently rewarded for our labors.

CONCLUSIVE WORDS

DR. DAVID STARR JORDAN, Chancellor of Stanford University and a man whose broadness and humanity have made him a world-power in the past and will constitute him an even greater force henceforth, whose voice is ever uplifted in the cause of Peace—has written in this number of our magazine:

"UNDER THE FLAG WHERE HATRED DIES AWAY THIS SINGLE STATE OFFERS ALL THE VARIETY SEEN IN EUROPE. IT IS THE OVERFLOW MEETING OF ALL THE NATIONS, AND TO THIS MEETING ALL COME IN PEACE AND IN MUTUAL TOLERANCE AND RESPECT. 'I CANNOT,' SAID CHARLES LAMB, 'HATE ANYBODY I KNOW,' AND HERE IN CALIFORNIA WE ALL KNOW EACH OTHER. AND WE LOVE CALIFORNIA BECAUSE SHE FIRST LOVED US."

Such words, uttered by a man of the calibre of Dr. Jordan are conclusive. They prove that California is a place where the spirit of brotherhood is exemplified to a greater extent perhaps than in any other part of the world; a place where the golden rule works all the week—yes, all the year around. In such a place is found true happiness and the conditions of mind that make for success and prosperity. We do not contend that such thing as failure is unknown in California, but we do assert that, where in most other places the preponderance of blame for a failure is frequently with the conditions, here it generally rests with the man if he does not succeed. A man of intelligence and industry has everything in his favor here, but he must have a basic knowledge of California conditions; must not, in other words, work in the dark. That is where our Readers' Service fills a need. We can aid the stranger within the gates, or the man who is already here but lacks essential knowledge of the place, to avoid errors of judgment and mistakes in method.

HOW TO AVAIL YOURSELF OF THIS SERVICE

FOLLOWING is a "*Registration Blank*" which readers are urged to fill out and mail to us *now*. It is not exhaustive, and may not meet the individual requirements in some cases, but at least it is a starting point. It gets us acquainted, so to speak. With your name and address on our books, and a general idea of your position and desires, we are enabled to advise you of especially interesting developments along the lines in which you have signified an interest and to send you bulletins and other data of value to you. If, as will frequently be the case, you desire detailed information on a special subject, write a letter setting forth clearly what you want to know and we will take up your problem at once. On the following page is the blank; fill it out and mail to us today:



REGISTRATION BLANK

California's Magazine

New Call Building, San Francisco

Rooms 708, 710, 712

I DESIRE to receive from you data of interest regarding California and also to be placed on your mailing list for everything issued that is likely to prove of value to me. It is understood that this service is to be absolutely free of cost to me, I being entitled to same as a reader of CALIFORNIA'S MAGAZINE.

My age is

I am married.

I have children.

Their ages

Their schooling to date

I am now engaged in

I am interested in California and would like to make my home there, providing I could engage in

I have \$..... which I could use to develop land if the land were provided so that I would not have to make any immediate cash outlay to secure it; or upon a liberal basis whereby production could be made to pay for the land.

I would like to make use of your Readers' Service to learn all possible about

Name

Address

If this blank does not give you sufficient space, write us a letter in detail setting forth your desires fully.

"WHY CALIFORNIA?"

The Climates of California range according to elevation, from moderated winter to unbroken summer. They will give you a sharp nip of frost or furnish you with calla lilies all the year—just as you choose location; but all the year will be growing season and they invite you to an open-air working season all the year except during a short time when rains are actually falling.

The Rivers of California constitute facilities for inland water transportation, the development of which is just beginning. They carry from mountain snows the irrigation water which makes fruitful valleys far wider than the Nile and far greater in range of productions. Thus the rivers invite you to produce and offer to move your products to market.

The Soils of California invite you to plunge implements into them to the limit of your motive power. They are prevalently deep loams and free from stones—though one can find soil troubles if he does not watch to avoid them. But as a rule California soils invite plants to deeper rooting than the soils of wintry regions and reward the grower accordingly.

The Forests of California contain the largest trees in the world—higher and older than many of the pyramids of Egypt and they are tokens of the blessings of God rather than the servitude exacted by despots. The California forests welcome you to activity in forest industries which, under conservation now provided, will enrich and make glad all coming generations.

The Mountains of California call you to uplifting contemplation of their grandeur. They will shelter you from arctic blasts and blizzards. They hold in trust for you great mineral treasures. Their thousands of valleys offer pasturage for flocks and herds; their lakes and streams abound in fish.

The Plants of California present a most attractive invitation to live among them. The native plants are unique, beautiful and characteristic of the State. The introduced plants include all worth growing for use or beauty from all temperate and semi-tropical countries. The plants alone demonstrate to an observing visitor that he has come to rare richness of soil and salubrity of climate.

California Farming Industries are largely advancing by co-operation of producers. New comers are urged to take a share in this co-operation for the greater joy of living amid neighborhood improvements. Californians treat a man as they hope to be treated by him. "Well come and well stay" is their greeting to strangers.

The People of California are generous, hospitable, broad-minded and outspoken. They cordially welcome to friendship all those of similar quality. The world has freely given of its best people to California and therefore Californians are always on good terms with the world. They want more neighbors of their own kind.

—that is "Why California"!

FOUR GREAT SEALS OF Prosperity

